FEBRUARY 1, 1954

NEWS ISSUE

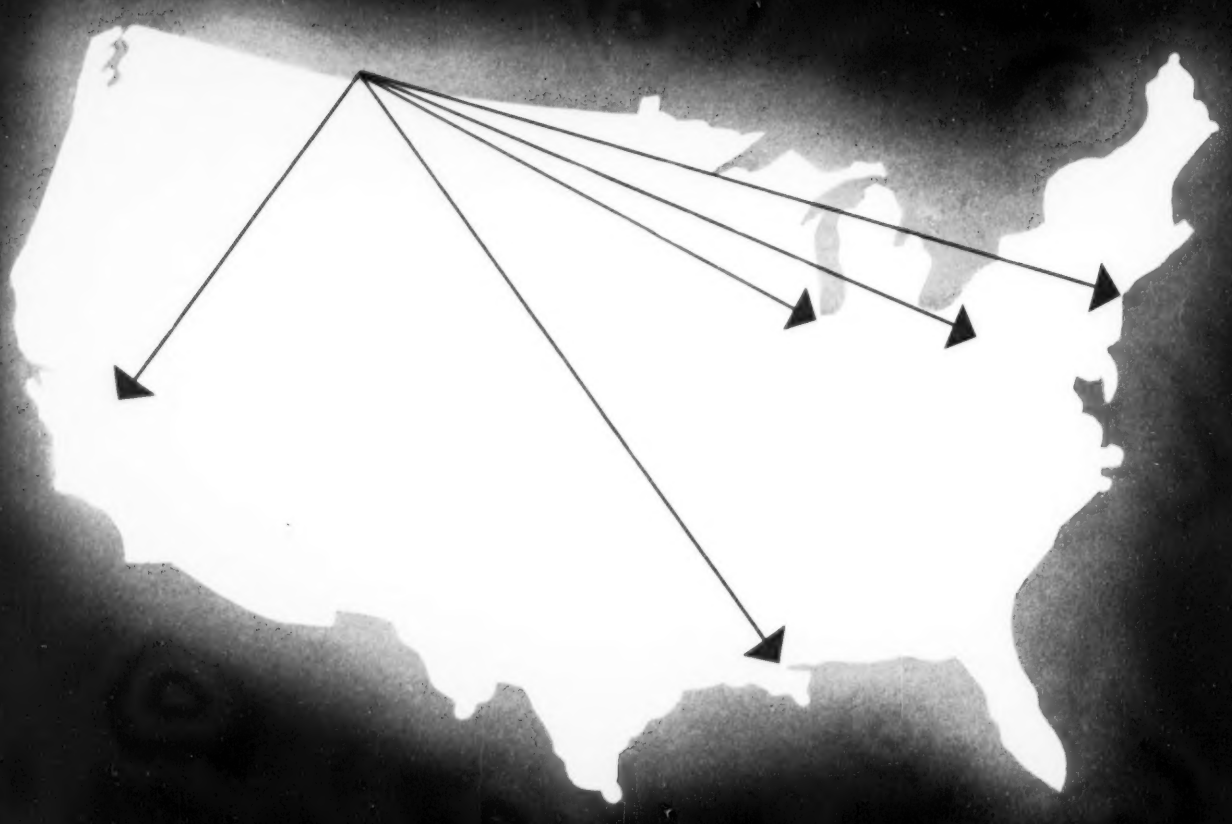
Electrical World

Price 35 Cents

A McGRAW-HILL PUBLICATION

This Week

EW visits Pine Flat, New Orleans, Chicago, Youngstown, and Elizabeth...



...to report on:

a "hot" snow gage, an industrial relations meeting, home lighting, power station design, and Al-Cu connections

AVAILABLE DRAWINGS WERE VITAL IN CUTTING MANUFACTURING TIME TO 51 DAYS FOR THIS 20,000 KVA TRANSFORMER FOR LOUISVILLE GAS & ELECTRIC.

Emergency in Louisville demonstrates how—

Standardization cuts vital engineering time

Duplicate design slashes details, enables G.E. to build 20,000 kva transformer for L.G.&E. in record 51 days

Growing use of standardized, pre-engineered equipment is one of today's most significant trends in the utility industry. More and more companies are taking advantage of the benefits inherent in standardization—especially in medium transformers where savings of as high as 75 percent in engineering man-hours and 90 percent in drafting time contribute to an approximate 8 percent reduction in price and faster delivery.

AVAILABLE DRAWINGS SAVE 8 WEEKS

A dramatic demonstration of the scope and the importance of such time savings was the recent emergency at Louisville Gas & Electric Company where a 20,000 kva power transformer was destroyed by external explosion. Normal manufacturing time for a replacement unit would have been 52 weeks. However, with engineering and manufacturing drawings available from the original unit, a duplicate transformer requiring no engineering and almost no drafting was rushed to completion in 51 days. Since available drawings eliminated the need for 8 weeks of preliminary engineering, manufacture started immediately, using 1,000 employees working round-the-clock.

Although Repetitive Manufacture has not been extended to transformers of this size, this example does serve to demonstrate the contribution which standardization can make to the industry.

ENGINEERING AND DRAFTING TIME is virtually eliminated in standard units. Lynn Wetherill, Manager of Power Transformer Engineering (left) and W. S. Ginn, General Manager of Power Transformer Dept., examine standard drawings for a typical 5,000 kva RM power transformer.

ROME PLANT EXTENDS BENEFITS

And as part of its program to broaden and extend the benefits of standardization still further, General Electric is presently completing a $25,000,000 plant at Rome, Ga., for producing RM (Repetitive Manufacture) transformers from 501 to 10,000 kva.

If you believe additional opportunities for cost and time saving applications of standardized transformers, substations and structures exist on your system and would like more information, contact your local Apparatus Sales Office or write Sec. 301-250, General Electric Co., Schenectady 5, N. Y.

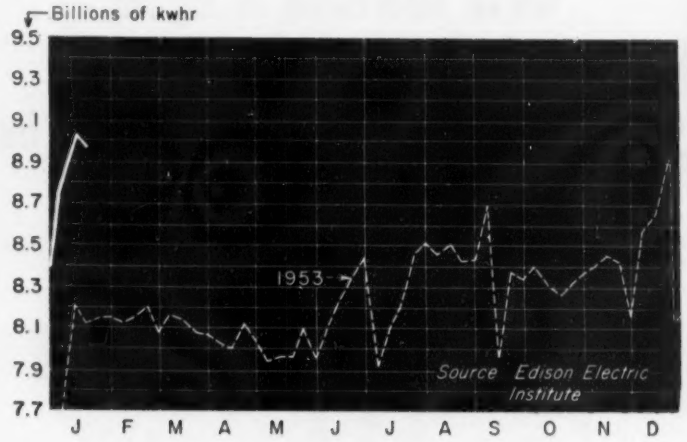
MORE POWER TO AMERICA

GENERAL ELECTRIC

VOLUME 141, NO. 5

February 1, 1954

Electrical World



Output Week Ended Jan. 23—8,976,000,000 Kwhr

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
Jan. 23	+10.2	+6.5	+5.5	+2.5	+11.9	+21.3	+8.1	+9.6	+30.6	+9.4
Jan. 16	+11.0	+7.4	+6.9	+3.0	+10.1	+22.2	+8.9	+11.0	+31.1	+11.4
Jan. 9	+7.8	+4.3	+5.4	−0.3	+6.0	+17.5	+5.6	+9.7	+26.9	+8.7

Electric Power Statistics

		Latest Month	Preceding Month	Year Ago
Peak Load (Million Kw)	Dec.	80.9	78.1	75.2
Capacity (Million Kw)	Nov.	89.81	88.62	80.91
Production (Billion Kwhr)	Oct.	37.61	37.04	34.87
Hydro	Oct.	7.14	7.59	7.02
Fuel	Oct.	30.48	29.45	27.85
Fuel Consumption				
Coal (Million Tons)	Nov.	10.17	10.22	9.95
Oil (Million Barrels)	Nov.	6.91	6.78	7.77
Gas (Billion Cu Ft)	Nov.	81.13	96.85	69.17
Sales (Billion Kwhr)	Oct.	32.21	32.64	30.15
Residential	Oct.	8.70	8.55	7.72
Commercial	Oct.	5.62	5.90	5.09
Industrial	Oct.	15.56	15.67	15.16
Other	Oct.	2.33	2.51	2.17
Net Income Class A & B Companies ($ Million)	Nov.	84.99*	76.19	80.63
Estimated Dec. '54 Peak (Million Kw)	Oct.	94.8	95.0	95.7
Kwhr per Residential Customer (12 Month Average)	Nov.	2,331	2,318	2,155
Revenue per Kwhr Residential Service (12 Month Average)	Nov.	2.75¢	2.75¢	2.77¢
Canadian Production (Billion Kwhr)	Oct.	5.51	5.09	5.42

Business Statistics

FRB Industrial Production Index†	Nov.	130*	132	133
Gross National Product Annual Rate ($ Billion)	3rd Qtr.	369.0	372.4	345.3
EW 4 Industry Production Index†	Dec.	120.4	121.8**	125.9
ENR Construction Cost Index††	Jan.	128.7	128.2	123.1
BLS Consumer's Price Index	Nov.	115.0	115.4	114.3
NEMA Insulation Materials Sales Index†	Nov.	130	154	155
NEMA Electric Appliance Sales Index†	Nov.	70	91	100
NEMA Household Refrig. Sales Index†	Nov.	35	46	77

* Preliminary ** Revised † 1947-49=100 †† 1949=100

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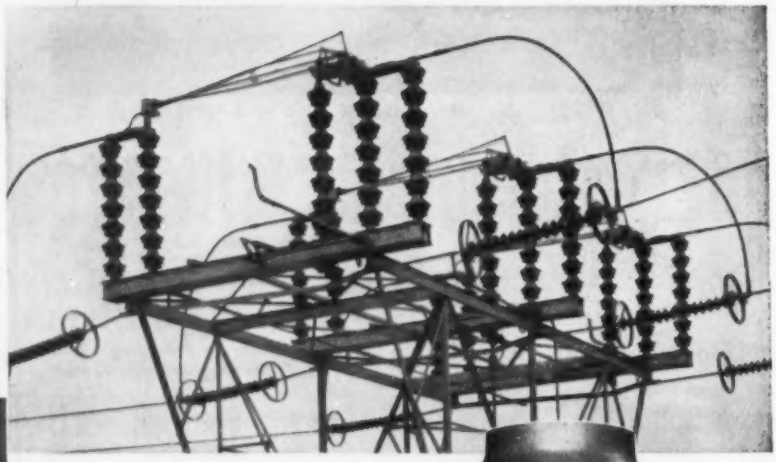
NO. 10 IN A SERIES

A SUB STATION DESIGN ENGINEER ASKS—

"we're interested in higher voltage switch and bus unit operation. Do you have a service record on 220 KV?"

HERE'S OUR ANSWER:

Yes sir! For example, these Pinco 735 units installed at 220 KV by a large eastern utility back in 1929. Operating conditions have been rugged, but these insulators in seven unit stacks have given *twenty-four years of continuous, trouble-free performance* . . . stacks of evidence that Pinco 735's are right *for* the job . . . right *on* the job!



(Right) Rugged porcelain—a balanced design with larger second and center shells—the extra strength and extreme accuracy of assembly . . . all contribute to the trouble-free performance of Pinco 735 switch and bus units.

(Left) Here's a close-up of one of our master jigs in which the 735 unit is assembled. This operation assures exact bolt hole alignment—also cap and pin mounting surfaces are within 3/10,000 of an inch of parallelism.

See Pages 112 to 123 in Pinco Catalog No. 49 for complete electrical and mechanical specifications covering all Pinco Switch and Bus Insulators. Do you have a copy? If not, write us.

The Porcelain Insulator Corporation
LIMA, NEW YORK

PINCO INSULATORS

RIGHT ON THE JOB—

THE ELECTRICAL WEEK

The Issue's News Highlights—White House is asking private utilities to play a bigger role in supplying power to atomic installations, thus lessening the size of the AEC load that TVA carries.

Randall Commission recommends "Buy American" laws be scrapped; Congressional opposition is expected . . . Raver proposes Interior be allowed to buy excess power of local agencies . . . Chamber of Commerce says TVA would be in red if it met tax obligations of private utilities.

"If the promise of the RCA atomic battery is ultimately fulfilled on a large scale, the power plant of that day would have only an atomic generator connected directly to cables carrying to far-flung communities the power needed for the multitudinous purposes of peace."

This was the heady prospect offered last week by Radio Corp of America in introducing a battery that converts atomic energy directly into electrical energy. The speaker was Dr E. W. Engstrom, executive vice president in charge of RCA's Laboratories Division. Dr Engstrom said that with only a small amount of radioactive material—strontium 90—a single battery provides a millionth of a watt—enough to run a transistor audio oscillator circuit.

Heretofore, those concerned with producing electricity from the atom have thought chiefly of using radioactive material as a heat source to generate steam which would in turn be used to generate power in the conventional way. RCA sees its battery as pointing toward direct generation of electricity—an idea scoffed at by many leaders in the field as an idle dream.

Engineering studies begin today on two dams on the Clearwater River in northern Idaho, according to Pres Kinsey M. Robinson of Washington Water Power Co. WWP, with four other Northwest utilities, has applied for permits to develop Bruces Eddy on the North Fork and Penny Cliffs on the Middle Fork. "The participating companies," Robinson declared, "will not undertake any controversial building program. If we run into difficulties such as the hassle over Hells Canyon Dam we will drop the entire matter."

Soviet Union's 57th veto in the United Nations Security Council killed a resolution to permit Israel to resume work on a Jordan River power project that would produce 180 million kwhr a year. Israel hopes to reopen the issue by submitting written guarantees that land and water rights of neighboring Syria, chief opponent of the project, would be protected.

British Columbia Electric has begun preliminary work on a 132-kv submarine cable to connect plants on the mainland with power-short Vancouver Island.

Off the Washington Wire . . . Congressional appropriations committees already have begun hearings on Interior Department's power budget. Interior officials come first—public witnesses will follow shortly.

Government lawyers this week will oppose Supreme Court review of the FPC license granted City of Tacoma for its Cowlitz River Project. State of Washington, its fish and game commission, and Izaak Walton League have teamed up to kill the license.

New information became available this week on the 60,000-kw atomic power plant Atomic Energy Commission is building:

- Present cost estimates for construction and initial fuel load is about $45 million for the plant.
- Designed gross heat output will be 900 million Btu's per hour.
- Reactor plant will produce steam at about 600 psia saturated.

Senate Labor Committee voted along party lines to approve nomination of Albert C. Beeson as an NLRB member. Democrats voted against him after James Carey, head of the CIO's electrical union, charged he was "coming straight out of business as an advocate of management." Testified Beeson: "Now you could say, if you like, that I am a union buster. On the other hand, I have stood up and explained to our managements plenty of times that they (the employees) have every right to belong to a union."

A new rate schedule for the government's Fort Peck project was approved by FPC. Reclamation Commissioner Wilbur Dexheimer says schedule, which substitutes a graduated minimum annual capacity charge for a minimum monthly bill, will not increase customers' rates.

Superior Court, Boston, today will hear a petition of a group of Puget Sound P&L stockholders for the right to inspect company's list of stockholders.

Central Maine Power Co will build a steam station of 90,000-kw initial rating at Birch Point on Cousins Island in Casco Bay, near its Portland load center.

Executive Changes . . . Rob Roy Macleod, commercial manager of Niagara Mohawk Power Corp's Western Division, to commercial vice president of the utility . . . C. A. Hummel, vice president of Interstate Power Co, to executive vice president . . . J. Lawrence McNealey to vice president in charge of operations for Columbus & Southern Ohio Electric, succeeding Morgan L. Evans, who retires Feb. 28 . . . John G. Gibbs, assistant vice president of Citizens Utilities Co, to vice president of all engineering activities.

Obituary . . . Dr Karl B. McEachron, 62, General Electric Co engineer and authority on lightning protection, died Jan. 24 at Pittsfield, Mass.

Lighter Atomic Load Planned for TVA

• Administration calls on private utilities to supply a bigger proportion of the power requirements for AEC installations

• Authority's need for new steam plants would be cut down if less of its energy were earmarked for AEC facilities

Private industry is being asked to supply a larger proportion of Atomic Energy Commission's power requirements at the gaseous diffusion plant near Paducah, Ky.

Back of this is the White House proposal to shift some 600,000 kw of the AEC load from Tennessee Valley Authority to privately owned utility companies during the next three years. The shift would enable TVA to meet its other growing power loads without the necessity of initiating new steam-electric plant construction during the next fiscal year. This was set out in President Eisenhower's budget message (EW, Jan. 25, p 134).

The decision apparently hit both TVA and AEC without much advance warning. AEC has taken only the barest preliminary steps to determine whether utilities are willing or able to pick up the sizable new load.

Spokesmen for TVA were not willing to say whether calculating board studies had been made on the economic feasibility of diverting the capacity designed for AEC to other system loads. It was clear on the surface that if the capacity is diverted from TVA's Shawnee Plant, there will be considerable expense both in building transmission facilities and in operating losses.

Shift of the TVA load is evidently designed to substitute for the agency's proposed construction of the 450,000 kw Fulton steam-electric plant north of Memphis, Tenn. This item was knocked out of the agency's budget for the current fiscal year, and is again banned under the "no new starts" policy for fiscal 1955.

Shift at Shawnee

Both TVA and AEC sources indicate that the entire 600,000 kw of capacity to be diverted will come from TVA's Shawnee Plant in the extreme northwest tip of its system. Total capacity of this plant is rated at 1,350,000 kw nameplate and 1,500,000 capability. All but two of the ten 135,000 kw units at the Shawnee Plant were planned to serve the Paducah AEC plant.

There are several reasons for taking up all the TVA slack from this one plant rather than from plants serving the AEC Oak Ridge installation in the eastern part of the system. First, the capacity is most needed in the western part of the system as was indicated by site of the proposed Fulton plant. Second, previous attempts to get private utilities to serve a portion of the permanent Oak Ridge load met with no success. Third, prospects for getting the electric companies to carry a larger share of the load are much brighter in the Paducah area.

Another EEInc?

Across the river from the Shawnee Plant is the privately financed 735,000-kw Joppa Plant being built by Electric Energy, Inc, a group made up of five electric companies.

From the procedural standpoint, the easiest course would be simply to expand the EEInc contract from present requirements to cover the 600,000-kw AEC load to be diverted by TVA. This would bring Joppa Plant capacity to about 1,335,000 kw.

There would likely be adjustments in rate schedules to reflect future construction costs and additions to the Joppa Plant. In addition there would be more negotiations on the cancellation agreement as it would affect the additional capacity.

But both these matters would be relatively small as compared to negotiating a new contract with an entirely new industrial firm or group.

Political Implications

There can be no doubt that the TVA capacity shift is based primarily on policy and fiscal reasons. In his budget message, the President said the move was aimed at eliminating "the need for appropriating funds from the treasury to finance additional generating units."

TVA backers last year fought a well-organized but unsuccessful battle to restore funds for the proposed Fulton plant which were knocked out of the budget by the new Administration. They sought to represent the Fulton decision as the Administration's attitude on further expansion of TVA power generation.

It seems likely they will fight a similar battle this year. TVA Board Chairman Gordon Clapp, whose term expires in May, may lead this fight.

Clapp, a Truman appointee, and well-organized TVA backers are intent on bringing out in the open the Administration's views on further TVA power expansion. This is the only government agency that assumes a straight-out utility responsibility for supplying its wholesale power customers. Without assurances for future capacity expansion, it will have a hard time supplying load increases.

Hearings are slated to start in the near future on legislation which would divest TVA of this utility responsibility. Chairman George A. Dondero of the House Public Works Committee introduced the legislation and has promised to call hearings on it soon.

The question of TVA's utility responsibility may be settled either on the budget request or at the hearings of the Public Works Committee.

Clapp Says TVA Faces Tight Power Situation

Tennessee Valley Authority Chairman Gordon R. Clapp recently predicted that even if TVA were relieved of 600,000 kw of Atomic Energy Commission load "the region will face an exceedingly tight power situation in 1957."

Clapp made this prediction in commenting on President Eisenhower's budget recommendations to Congress.

The TVA chairman declared: "The budget program imposes in 1957 a precarious balance of expected demand and our capability to meet it. We hope national fiscal policy will permit funds to be requested for adequate generating facilities in time to prevent a serious shortage of power."

Urges 'Buy American' Changes

Randall Commission asks scrapping of laws favoring U. S. firms bidding on federal contracts. Opposition expected

Scrapping "Buy American" laws which give preferential status to American companies bidding on government contracts is one of the biggest political controversies the Randall Commission on Foreign Economic Policy came up with in its report released last week.

The U. S. heavy electrical equipment industry is sure to use all its influence to block passage of this recommendation by Congress. The bulk of the controversy over "Buy American" laws in recent years has turned around foreign bids for government purchases of heavy electrical equipment such as generators, transformers, circuit breakers, etc. Foreign concerns have been increasingly successful in selling electrical equipment to the government. Important segments of the industry in the U. S. have expressed concern over the Randall Commission's efforts to liberalize U. S. foreign trade policy, and Westinghouse Electric Corp filed a hard-hitting brief with the commission expressing its views.

Opposition in Congress . . . There'll be plenty of opposition in Congress to the "Buy American" recommendation and to other proposals made by the commission for lowering trade barriers. Sen Eugene Millikin, and Reps Richard Simpson (R-Pa.) and Daniel Reed (R-N. Y.) dissented from the commission's recommendations on trade policy. All three occupy key positions in Congress and will work hard to stall adoption of the Randall proposals. Simpson and Reed in particular almost certainly will back legislation to raise instead of lowering trade barriers.

Administration Support . . . But the Administration is getting set to throw its full weight behind the majority report of the commission. Interested departments of the government already are converting the report into proposed legislation which will be submitted to Congress in the next couple of months.

It will be a close fight which could go either way.

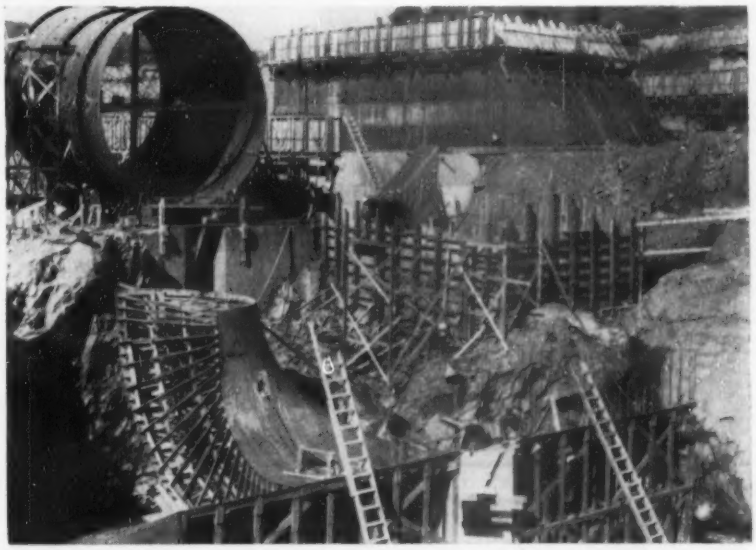
The Randall Commission recommended amending the "Buy American" Act to permit foreign concerns to bid for government contracts on an equal footing with American companies if the foreign bidders' countries granted reciprocal treatment to U. S. concerns.

The President would empower government procurement agencies by executive order to give equal treatment to foreign bidders pending adoption of the suggested amendment. This would amount to scrapping the "Buy American" laws, in practice. They would be suspended in effect until Congress amended them and if they were amended along the lines suggested, they would apply only to a few countries which discriminated openly against the bids submitted by American companies for government contracts.

Wage Differentials . . . Dissenting members of the commission insisted that differences in wage levels here and abroad should be considered in awarding government contracts. But they were overridden. The commission did recommend that tariff concessions should be withheld from products made by workers receiving substandard wages in their own countries.

But the commission did not recommend applying even this limited wage differential to foreign bids on government contracts.

Senator Millikin dissented strongly from the "Buy American" recommendation in the commission's report. He expressed fear that repeal of the "Buy American" Act would result in unfair competition for American companies. He was skeptical of the practicality of working out effective reciprocal arrangements for bidding on government contracts with foreign countries. He feared that many countries would find indirect ways of discriminating against U. S. bidders through the use of bilateral or barter agreements, exchange controls, or import licenses.



Connecticut's Biggest Hydro Plant

Largest hydroelectric plant in Connecticut is taking shape at Connecticut Light & Power Co's Shepaug site on the Housatonic River. Power plant will house a generating unit rated at 37,250 kw.

Construction view above shows section of disassembled penstock (upper left) in permanent setting above site of unit's future scroll case. Penstock is 25 ft in diameter and will carry 5,700 cfs of water. Section of draft tube is at lower left. Dam will be 1,412 ft long and 139 ft high. A portion of it can be seen at upper right. Project is slated to be completed in fall of 1955.

BPA Annual Report

Ex-Administrator Raver asks Interior be allowed to buy excess energy of local agencies

Paul J. Raver, former Bonneville Power Administrator and now Seattle City Light superintendent, recommended that Interior Department be empowered to purchase the excess generation developed by local regional power agencies.

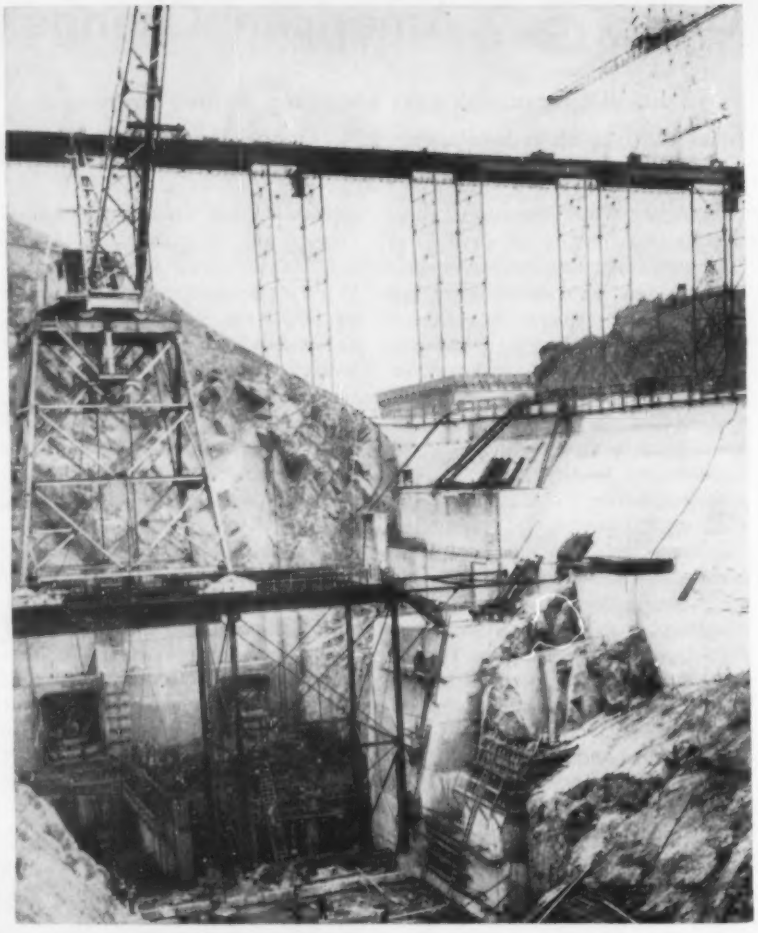
Dr Raver called for legislation enabling Interior to buy excess power in BPA's 16th annual report, released Jan. 17, which went out under his signature.

"Such legislation," he said, "if enacted with provisions adequately safeguarding its operation, would not only provide concrete assistance to local agencies in financing such projects but would also preserve the strong controls against monopoly as stated in the Bonneville Project Act. Unless such controls are maintained, there will be an ever present danger of a growth of monopoly of a great public resource. There will also be danger of a growing inequity in the cost of wholesale power as among the several classes of wholesale power purchasers."

Says Investment Is Too Low . . . In commenting on power policy trends, Raver said he believed the level of capital investment in the Columbia River development is "far too low at the present to permit an adequate stimulation of private industrial enterprise which is so vital to the region's continuing prosperity and which has existed in the recent past." Raver said studies indicate the region will need 6.5 million kw of new generation in the next 20 years—on top of plants now under construction—and that this will cost about $3.5 billion.

In concluding his letter of transmittal to Secretary of Interior Douglas McKay, the outgoing administrator declared:

"In my opinion there needs to be a very early examination on the part of the federal establishment as to the extent which it may undertake to meet this requirement; and a clear understanding will be required with local utility enterprise, both public and private, as to the extent of local responsibility for such investment."



Concrete Pours in at Folsom Dam

The 500,000th yard of concrete was poured last month in the main river section of Folsom Dam, located on the American River 20 miles east of Sacramento, Calif. The 1,500-ft trestle straddling the river is now complete, so subsequent concrete pouring can be done with a hammerhead crane from overhead. Concrete pouring is scheduled to be finished in another year.

The first of three 54,000-kw generators to be installed in the power plant will go on the line January 1955. The dam and power plant, part of the Central Valley Project, will be operated by the Bureau of Reclamation when completed.

Revenue Drop . . . The annual report, covering the fiscal year ended June 1953, revealed that BPA gross revenues declined 2.5% from the fiscal 1952 level. The 1953 total was $39,175,209.

Sales to aluminum industry totaled $13,545,562, accounting for 34.6% of gross revenue, up slightly from the previous 12 months; sales to other industries amounted to $4,715,747 or 12.04% of gross revenue, up 1.4%.

Sales to privately owned utilities reflected the effect of the hydro shortage on the Columbia system. Revenue from power sold to eight companies was $6,239,276. This represented 15.92% of total sales, but is a 26.8% decline from fiscal '52. Publicly owned utilities of the regions purchased $13,882,890 worth of power, 24.44% of the total, a rise of 7%.

Other operating revenues added $791,734 to the gross.

Total energy generated at BPA's four federal plants was 17.6 billion kwhr, a drop of 5%. New units went on the line at McNary, Detroit, and Hungry Horse Dams increasing the system's capacity to 2,312,000 kw.

TVA Cost Analysis

Chamber of Commerce says authority would be in red if it had utility's obligations

Tennessee Valley Authority would be more than $41 million in the red if required to meet the same obligations as a private utility, a recent report of the U. S. Chamber of Commerce claims.

Entitled "The Continuing Cost of TVA," the report was prepared by the chamber's Natural Resources Department.

As compared with a privately owned utility, TVA has benefitted from an interest subsidy amounting to $284,457,000 during the first 19 years of its operation, says the report.

In addition, the report shows, private utility taxes on TVA facilities would have been $346,477,000 more than TVA has paid in lieu of taxes up to that date.

These two items together come to $41,096,000 more than TVA has collected in revenue from the sale of power over the 19-year period.

Principles to Govern TVA . . . The Chamber of Commerce document, most recent of a series on TVA finances, suggests these five principles that should govern the TVA power business:

1. TVA power should be financed through the sale of revenue bonds or by temporary borrowing from the U. S. Treasury at current interest rates on 15 or 20-year bonds. Direct appropriations by Congress for any phase of the TVA power program should be discontinued.

2. TVA should continue to make payments on funds borrowed for its power investment, as instructed by Congress in 1948, until that debt is liquidated.

3. TVA should pay interest on the unamortized portion of its power investment into the general fund of the Treasury.

4. TVA should pay state and local taxes equal to the state and local taxes paid by private utilities.

5. TVA should pay the U. S. treasury a suitable percentage of its gross revenue in lieu of federal income taxes.

President Eisenhower had previously urged in his budget message (EW, Jan. 25, p. 134) that the agency be required to pay a reasonable amount of interest on the government's power investment.

The report concludes that the long-run interests of the TVA area—and the country as a whole—would be best served if the TVA power supply were locally owned, locally managed, and locally financed.

Utility Seeks to Improve Air Cooler Power Factors

For the first time, a utility has put electrical manufacturers and distributors on notice that they will have to improve load characteristics of room air conditioners they sell in order to meet the utility's requirements of service.

In a letter to dealers and manufacturers, Union Electric Co of Missouri pointed out that air conditioners with power factors of less than 90% not only affect the quality of electric service, cause customer difficulties and demand unnecessary wiring expense, but also tend to limit sales of the unit. This last because so many residential customers still have only 2-wire, 120-v service.

To meet the problem, the utility plans to require that units installed in the area after Jan. 1, 1955 have full load power factors of 90% or above. The letter, signed by Merrill E. Skinner, vice president and director of sales, suggests one way to do this would be to provide self-contained capacitors for power factor improvement. The requirement, the letter stated, would be an application of a power factor rule already in force.

"We think," Skinner told EW, "that the ultimate market will be expanded if they take action promptly, as otherwise ¾ hp and larger units will lose any prospect of being considered plug-in devices and each one will have the handicap and burden of special wiring."

Langlie Sees Hells Canyon as 'Good' Campaign Issue

The controversial Hells Canyon hydroelectric project would make a good campaign issue, Gov. Arthur B. Langlie of Washington recently told state Republican leaders.

"That would be a delightful issue to debate with the Democrats," he declared. "If we couldn't win on that, we don't deserve to be in the campaign."

Langlie has endorsed Idaho Power Co's plan for three low dams rather than plan for one high federal dam.

Pearl Sworn in as BPA Chief

William A. Pearl (right) is shown taking oath recently in Washington as administrator of the Bonneville Power Administration. Onlooker during ceremony held at the Interior Department was Interior Secretary Douglas McKay (center). Floyd E. Dotson (left), chief clerk, administered the oath.

IN THE INDUSTRY

Reverberations from the riotous annual meeting of the National Rural Electric Cooperative Association held in Miami last month are still bouncing around. But above the din one thing comes through clearly: A war of attrition is taking shape. Arrayed on one side are the leaders of the Interior Department, representing the Administration; on the other, a number of NRECA's leaders, particularly Executive Manager Clyde T. Ellis.

NRECA, Interior Cudgel Up to One Another

The battle lines were informally drawn, when, during a speech to the 6,000 delegates, Assistant Interior Secretary Fred G. Aandahl suggested that "crusaders" were trying to use the co-ops and their associations "to foster federal [power] monopoly." He had previously quoted from a speech made last year, in which he said:

"Appeals to Congress have been equally fruitless during the past several years. It seems practically impossible to impress upon the members that the government has assumed the responsibility of wholesale power supply and, therefore, must prepare to carry out its program and meet the demands of the area."

The remark, Aandahl stated, indicated an opinion that would "certainly point in the direction of a strong trend toward federal monopoly of the electric power business."

From the floor, Ellis challenged the Interior official to identify the "crusaders" to whom he was referring. Aandahl declined to name names and retorted with:

"I referred to anyone who is promoting a government responsibility in supplying electrical energy in addition to that which comes from the hydroelectric plants that are associated with multipurpose water development projects, or the single purpose projects closely associated with them."

Before all the subsequent dust had settled, the delegates adopted two resolutions by voice vote upholding Ellis and denying the association was being used to create a power monopoly.

What's the Strategy? . . . Beneath all the furor the burning question was: "Why did Aandahl bring the issue out before this assemblage?" You don't usually boo the Yankees in Yankee Stadium.

On the surface, not many delegates gave Aandahl the benefit of the doubt that he was presenting for their consideration a problem of serious moment; one they ought to be seriously concerned about.

Whatever his motives, some government officials were admitting Aandahl simply underestimated the fury that would greet his remarks; that he overplayed his hand in trying to hit directly at Ellis. They say, on paper at least, the two resolutions put the NRECA boss in a stronger position than before the matter came up.

This view is shared by officials of the Rural Electrification Administration in the Department of Agriculture, none of whom saw Aandahl's text before it was delivered.

What's the Effect? . . . But whatever its immediate purpose, far more crucial are its long-range effects. One thing is apparent. The cleavage between Interior and NRECA's staff is deep and probably irrevocable. Aandahl made it abundantly clear that the Department won't go out of its way to deal with Ellis. He is still banking on more rural co-ops coming to his defense. His office has said, that a couple of cooperatives have already praised his NRECA address, though they declined to say whether these co-ops are NRECA members or usually antagonistic to NRECA.

On the other hand, the alacrity with which Ellis jumped to the attack against Aandahl indicated NRECA may now officially oppose Interior Department policy all over the country. In the past, Interior officials, without naming names, have charged that "agitators" had been stirring up trouble against the Department's policies.

This "agitation" may have an effect on Congress from time to time, particularly during this election year.

TECHNICAL NOTES

ARCHER E. KNOWLTON

Warped sootblower elements have been known to abrade boiler tubes to point where replacement was necessary.

Towers with mild-steel seam-welded tubes for the bracing members and high tensile steel angle sections for the main legs and primary crossarm members are proposed for the 275/380 kv lines of the British Grid.

Centralized control should surely be equal to such emergencies as boiler tube failure, loss of combustion ignition, loss of condenser vacuum and sudden loss of load.

Restoration of service for the sake of radio reception may aid in maintaining civilian morale in times of emergency.

Extent of damage to telephone plant has little relationship to the voltage of joint use power lines largely because of the favorable de-energization characteristics of the higher voltage systems.

DBPC-inhibiting of circuit breaker oils has been found to be neither advantageous nor disadvantageous.

Sulfur hexafluoride gas is comparable (at 30 psi) to oil as to its dielectric breakdown strength and some 100 times as good as air in a.c. interrupting ability.

Non-magnetic pipe (e.g. bronze or aluminum) offers no escape from the relative high losses incurred when using steel pipe for pipe-type cable installations. Suitable non-metallic pipe would offer advantages.

Flux distortion and variable permeability in the joint regions tend to promote harmonics along with the fundamental 120-cycle vibrations that arise from a 60-cycle transformer.

Practically half the generating capacity in the country at the end of 1952 was based on the steam reheat cycle.

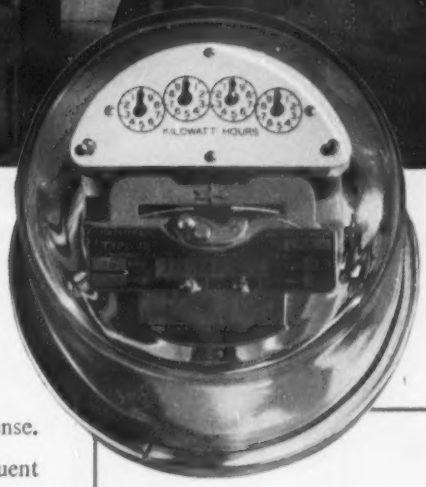
High speed facsimile can transmit and record in finished form 3,000 words of newsprint a minute. Copy is transmitted in letter-form (8½ x 11 in.) at 80 pages per hour.

Probability may promise immunity the first time a safety rule is violated. Probability may practically guarantee a fatality on the second violation.

Adequate torque margin to start and accelerate boiler feed pumps for large unit installations will call for an auxiliary supply affording not less than 80% of normal voltage during starting.

a full measure of operating economy

Sangamo J Meters



Many Utilities have installed modern meter test and shop facilities because Meter Department Executives are well aware of the many economies made possible by such labor saving equipment.

But . . . the *full* measure of operating economy is obtained only when such facilities are coupled with a meter *designed* for minimum maintenance expense.

The Sangamo Type J Meter: Stays accurate—frequent recalibration is unnecessary . . . Doesn't deteriorate in corrosive atmospheres . . . Remains undamaged under extreme surge or overload conditions—high current carrying capacity reduces burnouts on heavy overloads.

Keep *your* operating expenses at a minimum with the proven Sangamo J Meter.

SANGAMO
ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

SANGAMO

Only Measured Facts are Known Facts

IM53-5

DISTRIBUTION TRANSFORMERS
different from others because.....

....Nitrile rubber gaskets at all tank openings prevent breathing...seal out contamination

You get years of extra service from your General Electric Spirakore* distribution transformer because "we stopped their breathing to prolong their life." **EVERY OPENING**—cover, handhole, high- and low-voltage bushings—is sealed with a nitrile rubber gasket. These gaskets resist oil, sunlight and atmosphere . . . they require no cement . . . are easily removed *and used again and again.*

This air-tight seal maintains the high dielectric strength of the oil . . . prolongs the life of the insulation.

REMEMBER . . . all transformers are not alike . . . compare the General Electric plus features in the chart below and see for yourself.

For more information on distribution transformers, either unit-type or conventional, contact your nearest G-E sales office, agent or distributor, or write to General Electric Company, Section 431-5, Schenectady 5, New York.

*Registered trade-mark of General Electric Co.

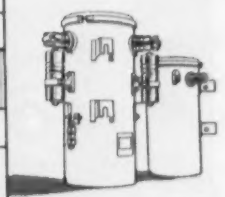
You can put your confidence in—

GENERAL ELECTRIC

ALL TRANSFORMERS ARE NOT ALIKE

(make this simple comparison and see)

FEATURE	General Electric	Mfr. A	Mfr. B	Mfr. C	Mfr. D	Mfr. E
Production-line impulse testing	YES	NO	NO	NO	NO	NO
Nitrile rubber gaskets at all tank openings	YES	NO	NO	NO	NO	NO
Strenicor pressure terminal clamps	YES	NO	NO	NO	NO	NO
Insulated clamp-type connectors on tank wall hv bushings	YES	YES	YES	NO	YES	YES
One-piece cover band	YES	NO	NO	NO	NO	YES
Terminals designed for both copper and aluminum conductors	YES	NO	NO	NO	NO	NO
Gapped valve-type arresters	YES	NO	NO	NO	NO	NO
Nationwide company-operated service facilities	YES	YES	NO	NO	NO	YES

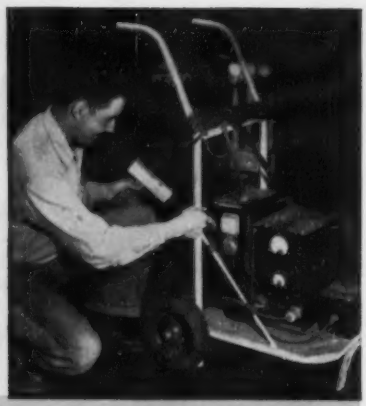


UNIT-TYPE CONVENTIONAL

"Take your choice G. E. makes both"

A charge of Freon gas is released inside the transformer through the cover, placing the unit under positive gas pressure.

The electronic leak detector "sniffer" gun is passed around all welded and gasketed joints of the tank, cover and bushings. If *any* gas leaks through a joint, it is drawn into the gun



Gas drawn into the gun passes through an electronic detector circuit which sends a signal to the amplifier. The signal actuates an alarm to indicate a leak. If a leak is detected, the faulty seal is corrected and retested.

"When a POLE STAR transformer passes the Leak Detector Test...

I know it's sealed!"

says **Frank Osiecki**
POLE STAR FINISHER

Prior to shipment each intermediate-size Pole Star Transformer (167 through 500 Kva) is given a reliable leak detector test to make certain that the transformer is properly sealed when it leaves the factory.

This is another one of the many extra steps in a carefully planned manufacturing procedure. It is another example of the quality control that Pennsylvania builds into all Pole Star transformers.

PENNSYLVANIA TRANSFORMER COMPANY
A McGraw Electric Company Division
CANONSBURG, PENNSYLVANIA • *Greater Pittsburgh District*

Pole Star transformers are available in all standard sizes from 3 Kva through 500 Kva, and in voltages up through 43.8 Kv.

THOMAS DIGNAN, Boston Edison president, addresses EEI Accident Prevention Committee

Safety Is for Men and Tools . . .

. . . New England executive tells EEI committee. Discussion brings out eight facts covering distribution practices

Top management views safety as a way to reduce human suffering as well as economic losses, Irwin L. Moore, New England Electric System president, told the winter meeting of the Edison Electric Institute's Accident Prevention Committee in Boston, Jan. 18-19. The "safe" operation is the only efficient operation, he said, in commending the progress made in the past 20 years in conquering hazards in every phase of utility work.

Continued emphasis on safety was shown by a reported reduction in accident frequency rate during 1953 for 25 out of 37 companies representing 49% of the industry. An exhaustive report on hazards associated with TV antennas was presented for committee consideration. It details legal liabilities, public relations, structural requirements in specific areas, building and inspection codes, and reference literature. Discussion centering on distribution system problems brought out these points:

1. More periodic tests are being made on hot line sticks, rubber blankets.

2. Gas tests in transformer vaults and manholes are being repeated after lunch periods.

3. Protective equipment for linemen deserves continuous use during pole-top work.

4. Creosoted poles appear to present some electrical hazards.

5. Closer cooperation is necessary with construction contractors to cut careless handling of crane booms under overhead lines. Warning signs should be placed in mobile crane cabs. Extra precautions are needed when highway and other outside jobs are accelerated following work stoppages or curtailments.

6. Studies of office worker accidents are leading to greater use of wheeled devices and elevators to avoid stairways. Emphasis is being placed on neat offices and uncluttered stockrooms.

7. Use of rubber sleeves by overhead workers was supported by overwhelming majority.

8. Electrical tests of "hard" hats are favored, but mechanical value, and not insulating quality, should be stressed.

The next committee meeting is set for July 1-3 at the Mark Hopkins Hotel, San Francisco, according to chairman R. P. Douglas, Detroit Edison Co.

5 Utilities Nominated for 1953 Coffin Award

Five electric companies have been nominated for the Charles A. Coffin Award for 1953. The group consists of a holding company, the American Gas & Electric Co; and four operating companies, Cleveland Electric Illuminating Co, Connecticut Light & Power Co, Texas Electric Service Co, and Wisconsin Electric Power Co.

These companies were selected from a list of 25 by a committee consisting of George C. Tenney, editor of "Electrical West"; P. B. Garrett, editor of "Electric Light & Power"; and Ralph H. Flynn, publisher of "Electrical World."

All of the nominees will receive certificates of citation. And all have an opportunity to take the Coffin Award of a gold medal and $1,000 for the company's employee benefit fund. Presentation will be made at the annual convention of Edison Electric Institute in June at Atlantic City.

The award is made annually in recognition of outstanding achievements and to inspire electric companies in their efforts to advance the industry and give the best possible service to their customers.

Bureau of Reclamation Announces Promotions

With announcement of four promotions in its top echelon, Bureau of Reclamation completes its present round of reorganization.

Reclamation Commissioner W. A. Dexheimer has announced these changes:

Grant Bloodgood, presently chief construction engineer at the Denver engineering center, to be associate chief engineer.

Frank M. Clinton presently assistant director of Region I at Boise, Idaho, to succeed Kenneth F. Vernon as director of Region VI with headquarters at Billings, Mont.

R. J. Walter, presently construction engineer for the Webster Dam near Stockton, Kan., to succeed Avery A. Batson as director of Region VII with headquarters at Denver.

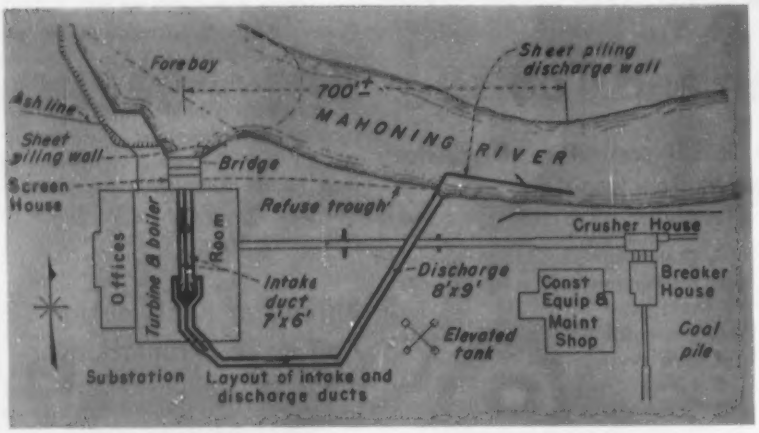
J. R. Riter, chief hydrologist of the bureau with headquarters in Denver, designated as chief development engineer heading the Project Development Division in Denver which includes the hydrology branch.

Ohio Edison Selects Load Center Generation

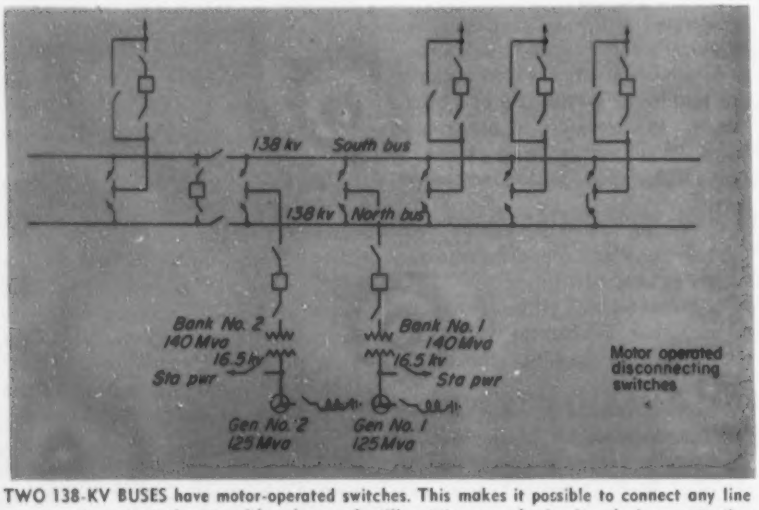
Builds Niles Station in Youngstown-Warren area when study shows maximum application of fuel efficiency measures overcome high fuel cost and difficult water conditions

J. H. FOOTE, Chief Engineer in Charge,
Commonwealth Associates, Inc, Jackson, Mich.

NILES PLANT is located on the Mahoning River, 15 miles northwest of Youngstown. It will have



CIRCULATION OF COOLING WATER will be double river flow in certain seasons. Pooling effect is provided by the arrangement of forebay and discharge. The forebay is 150 by 500 ft


138 kv South bus
138 kv North bus
Bank No. 2 140 Mva 16.5 kv
Sta pwr
Bank No. 1 140 Mva 16.5 kv
Sta pwr
Motor operated disconnecting switches
Gen No. 2 125 Mva
Gen No. 1 125 Mva

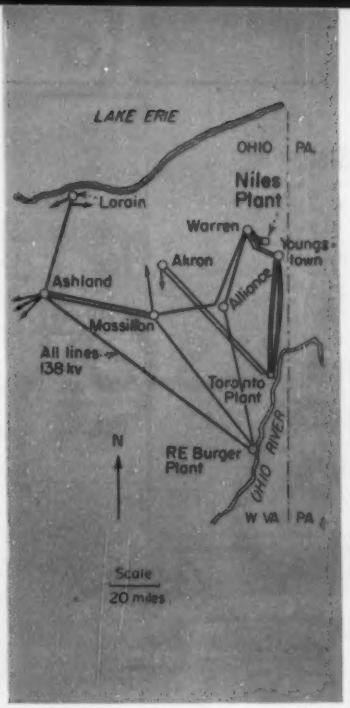
TWO 138-KV BUSES have motor-operated switches. This makes it possible to connect any line or generator at station to either bus and still retain normal circuit relaying protection

Niles Station of Ohio Edison Co is located on the Mahoning River about 15 miles northwest of Youngstown. This location was selected because of its close proximity to load areas which would use its entire output and despite difficult condensing water conditions and higher coal costs than could be obtained at other available sites. Careful cost analyses showed its economy with the maximum application of fuel efficiency measures compared to the cost of transmission and associated losses.

It is to be expected that this plant-location situation will become increasingly significant as the service demands of major load areas increase and as sites on major rivers and lakes become less readily obtainable. Availability of reheat cycles and justification of large generating units on major interconnected systems are important factors in the present-day comparison of sites which might previously have been considered uneconomic or marginal in cost comparisons.

Some Efficiency Loss . . . Efficiency will be reduced an estimated maximum of 6% during seasonal low water conditions, and special attention must be given to provisions for cooling water circulation. Even with a short distance provided between discharge and intake for pooling, the normal cooling effects of the open

two units of 125,000 kw each. Operation will be at 1,450 psig, 1,000F with reheat to 1,000F



LOAD CENTER LOCATION proved to be most economical for the Niles Station

DISCHARGE POOL was built downstream to keep outgoing and incoming waters from intermingling

area of water in the river are of considerable benefit in the location at Niles.

The new generation will have an estimated annual heat rate of 9,600 Btu per net kwhr generated with the average water conditions expected. Two turbine-generators rated at 125,000 kw gross output each or 106,000 kw net dependable capability are scheduled for operation early in 1954.

Each turbine is of the two-cylinder, tandem-compound, double-flow, condensing, reheat type. Turbine operation is to be at 1,450 psig, 1,000F initial steam with reheat to 1,000F and 2-in. mercury exhaust. Plant capacity factor for the two units is estimated at about 75%.

Present estimated cost of the completed plant is $128 per kw of rated gross output, including site development, substation and step-up transformers for connection to the 138-kv transmission in the area. All boiler equipment and auxiliaries are totally enclosed in the building which has a total volume of 25.5 cu ft per kw gross rating.

Alternative Locations . . . The company has two generating plants located on the Ohio River, and both were considered for the added generation prior to selection of the Niles site. Advantages of the Niles location, on the Mahoning River approximately midway between Youngstown and Warren, Ohio, are that the total generation will about equal the present maximum load demands within a relatively short radius of the plant and that no major transmission additions are necessary.

Records showed coal costs for the Ohio River plants to be an average of 3¢ (maximum 5¢) per million Btu lower than for a company plant at Youngstown. Preliminary studies indicated however that this fuel cost advantage would be more than offset by the costs associated with transmission to the Youngstown-Warren load area. Generation at Niles is estimated to save peak transmission losses which amount to about 15,000 kw in capacity and approximately 100,000 Mwhr in energy per year, in addition to the transmission investment charges.

The integration of the former Ohio Public Service Co system with Ohio Edison in 1950 was of direct importance in considering the economy of the new plant. Before the integration Warren and Youngstown areas were served respectively by the separate companies. Prior to the acquisition, the Niles site was under consideration by Ohio Edison for its own area supply and for additional capacity to the interconnection with its subsidiary Pennsylvania Power Co directly across the state line. Effect of the acquisition and subsequent integration was to increase the economic size of units and of total generation which may be utilized within the near-by service area.

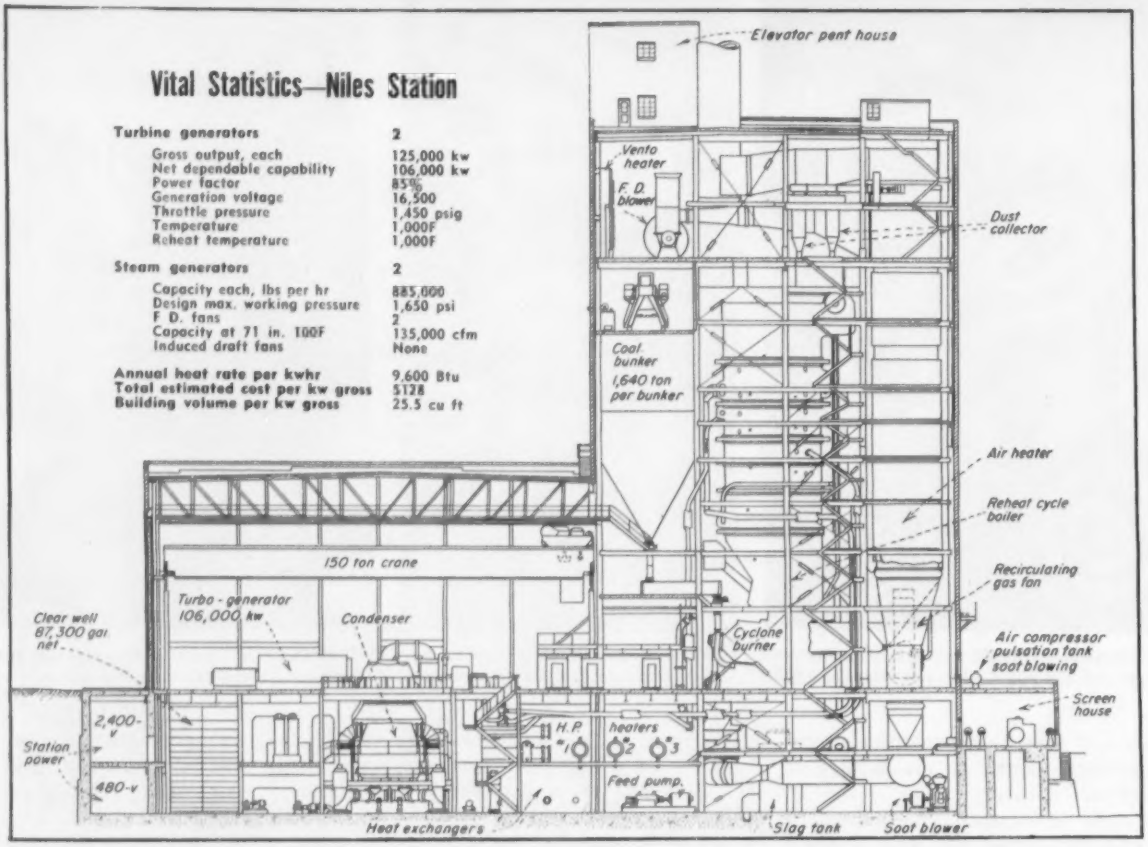
Cyclone Furnaces . . . The two Cyclone furnace steam generators are among the largest of this type so far installed. Each has a continuous output rating of 885,000 lb of steam per hour. Each steam generator is provided with four Cyclones. Pressure furnaces are designed to operate with bituminous coal crushed to pass a ¼-in. screen. The crushed coal is swept into the furnace by a stream of high velocity primary air. The secondary air stream enters tangentially to set up the swirling motion of the Cyclone. Tertiary or cooling air also enters at high velocity and aids in combustion.

Two forced-draft blowers with a discharge pressure of 2.5 psi at maximum load to deliver air to each steam generator are located on the top floor of the building. There are no induced-draft fans provided for suction operation. A tight furnace is essential, so careful attention to details such as soot blower opening and inspection openings is necessary. Elimination of the induced-draft fans reduces the cost, maintenance, and auxiliary power requirements.

Desired final superheater and resuperheater steam temperatures are

Vital Statistics—Niles Station

Turbine generators	**2**
Gross output, each	125,000 kw
Net dependable capability	106,000 kw
Power factor	85%
Generation voltage	16,500
Throttle pressure	1,450 psig
Temperature	1,000F
Reheat temperature	1,000F
Steam generators	**2**
Capacity each, lbs per hr	885,000
Design max. working pressure	1,650 psi
F. D. fans	2
Capacity at 71 in. 100F	135,000 cfm
Induced draft fans	None
Annual heat rate per kwhr	9,600 Btu
Total estimated cost per kw gross	$128
Building volume per kw gross	25.5 cu ft



TWO CYCLONE furnace steam generators supply the two turbo-generators at Niles Station. Each steam generator has four Cyclones. There are two forced-draft blowers for each steam generator but no induced-draft fans. Their elimination cuts cost and maintenance

maintained by automatic control of:

1. Recirculating gas fan inlet temperatures.

2. The proportioning dampers for gas flow between superheater and reheater tubes.

3. Water spray-type attemperators. Various combinations of these controls are used.

A fan recirculates gases from the boiler outlet back into the primary furnace. Control of the quantity of gas being recirculated is effected at the lighter loads in order to increase both superheat and reheat temperature values above those which would exist without gas recirculation. When superheat or reheat temperature reaches the 1,000F control point, further increase is prevented by proportioning gases passing over the reheat and the primary superheaters.

In load center areas such as at Niles, the slag type ash removal and the fly ash collection of this furnace design are advantageous. Molten slag falls into a water spray and finally into a large pool of water. This sudden cooling breaks up slag so it can be handled by ash pumps.

Cooling Water . . . Because of limited flow and possibly higher than normal temperatures of the river cooling water, the two-pass condensers with 65,000 sq ft of surface are somewhat larger than would normally be used for a plant of this rating. Circulation of the condensing water will be as much as double the river flow under seasonal minimum river conditions. A forebay about 150 by 500 ft was excavated 10 ft deep in the river in front of the screen house. A pooling effect is provided by arrangement of the forebay and discharge. Sheet piling is driven into the river bed to provide forebay and discharge walls with the discharge about 700 ft downstream.

The condensate and feedwater system does not include a separate surge tank. Condensate surges due to varying load will be taken in the unusually large deaerating condenser hotwell. Storage for starting up or shutting down a unit is provided by a clear well tank.

Condensate for Cooling . . . Condensate is used as a cooling medium for the reciprocating dry vacuum pumps, the primary and tertiary air jackets of Cyclone burners, the slag tap cooling coils, and the cooling coils in the boiler access doors, to protect against scale and corrosion which might result from the use of raw water. To guard against oxygen pickup a closed system is employed. It has an elevated expansion tank, with make-up provided by the gland water tank.

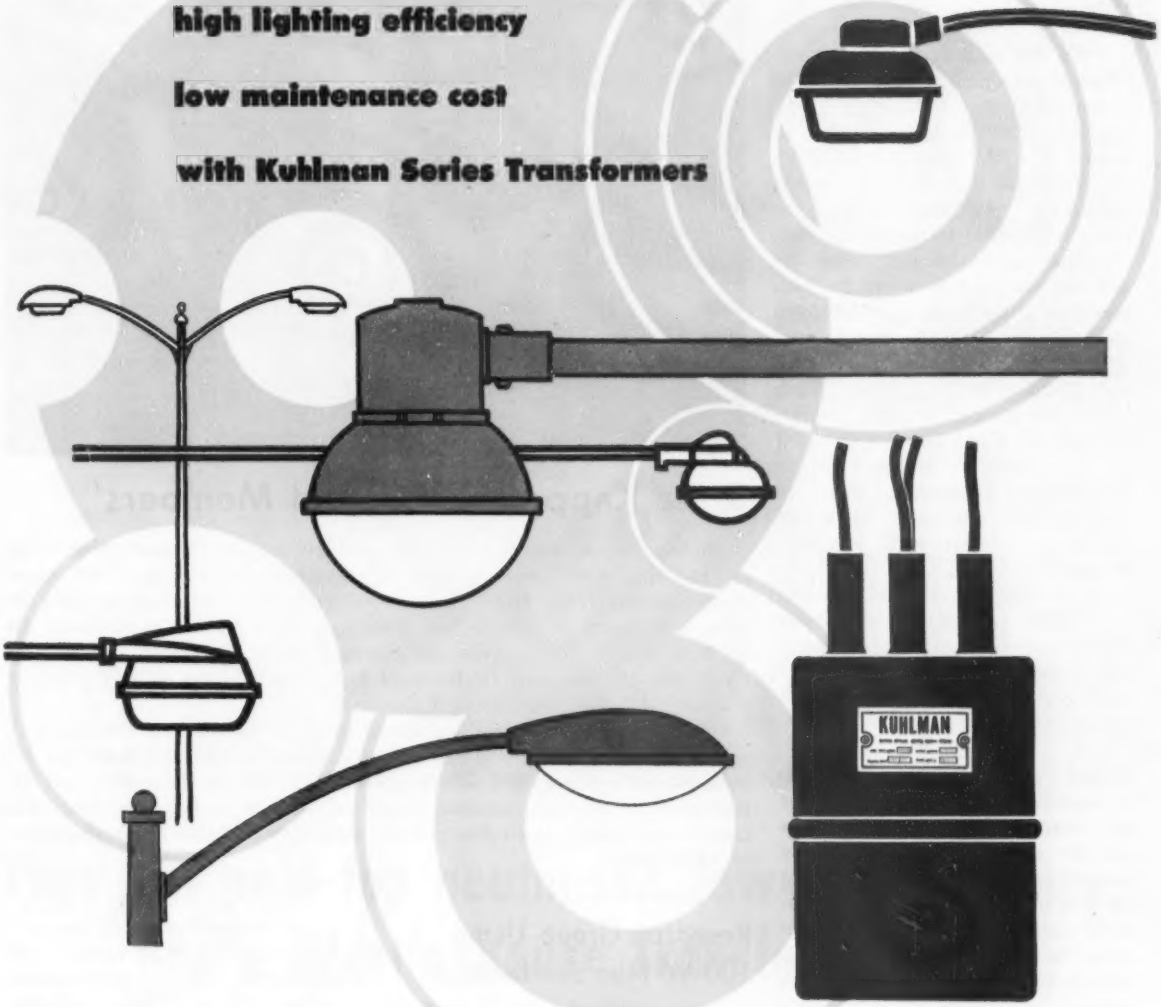
Heat absorbed by the cooling water is transferred to the condensate through a heat exchanger, and pumps are provided for circulation in this system. Indirect raw water cooling through a separate heat exchanger is provided for the starting period.

Electrical Features . . . Generators are connected to the system through two 140 Mva FOA transformers, delta connected on the 16-kv bus side and

high lighting efficiency

low maintenance cost

with Kuhlman Series Transformers



Utility executives know that maximum street lighting efficiency depends on good current regulation, for there lies the secret of greater illumination and longer lamp life in street lighting systems. Kuhlman Series Transformers, through the use of the bent iron core developed by Kuhlman engineers, provide current regulation that insures greater lighting efficiency at lower cost for Main Streets everywhere. Kuhlman Series Transformers, with a guaranteed current regulation of 1% over a range from 80% load to 110% load, help keep street lights burning brighter and longer.

Kuhlman Series Transformers permit the use of low voltage cable from transformer to lamp, eliminate system outages that are caused by trouble between the main circuit and the lamp, and help protect lamps from line surges. Compound filled and encased in a drawn copper bearing steel shell that is highly resistant to corrosion, these units require little or no maintenance. Kuhlman Series Street Lighting Transformers are made for manhole, pole base or aerial mounting. Utility executives can get complete information by writing for Bulletin CS-801. Kuhlman also manufactures Power, Dry Type, Subway, Safe-T-Kuhl, CSP and Rural Distribution Transformers. We will be glad to send you our bulletins on these units as well.

145-M

KUHLMAN

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN • Southern Division, CRYSTAL SPRINGS, MISSISSIPPI

EXPORT REPRESENTATIVE: INTERNATIONAL STANDARD ELECTRIC CORP., 15TH FLOOR, 50 CHURCH STREET, N. Y. 7, N. Y. CABLE ADDRESS: MICROPHONE, N. Y.

SIXTY YEARS OF PROGRESS IN THE ELECTRICAL INDUSTRY

wye connected and solidly grounded on the 138-kv line side. A transformer impedance of 8% was selected following an evaluation of transformer cost, losses, voltage regulation, system short circuits, and effects on system stability.

Main and pilot exciters are driven through reduction gearing from the generator at approximately 900 rpm. The main exciter is rated 340 kw, 375 v, dc. The pilot exciter is rated 2.5 kw, 250 v and is of the ac permanent magnet type. Automatic voltage regulation is provided for each generator.

Station auxiliaries are electrically operated, and station power for each generator is normally supplied from a 12,000-kva, type-OA transformer.

The 138-kv substation is designed with lightning stroke diverters. Each 138-kv line is equipped with an overhead ground wire which is terminated on the substation structure. Line entrance gaps of company design are used on each incoming 138-kv line and set to coordinate with the station insulation.

All 138-kv circuit breakers are rated 1,200 amp, 5,000 Mva interrupting capacity and are equipped with pneumatic mechanisms. They are 3 cycle breakers suitable for 20 cycle reclosing.

Central Control Room . . . Controls for operation of the turbine-generator and steam generator for both units and for the 138-kv substation are located in a centralized air-conditioned room on the turbine floor level. Relatively short line additions were required to provide four connections into the existing 138-kv transmission system.

Arrangement of the 138-kv substation is planned for normal operation with each generator supplying two lines, but all of the lines and either or both of the generators can be connected to either of two main buses and still retain normal circuit relaying protection. This arrangement and the use of horizontal-type bus construction provide flexibility for maintenance as either bus may be deenergized without interfering with the station output.

Control for the coal handling is decentralized with each motor operated by local control switches to assure patrolling of the conveyor line before the coal flow starts. Sequential tripping is provided to stop coal flow from the source in case of trouble.

3 Eta Kappa Nu 'Eminent Members'

Three prominent electrical engineers were initiated into Eminent Membership of Eta Kappa Nu Association, electrical engineering honor society, at a recent dinner meeting at the Hotel Statler, New York. They are (left to right) Dr Marvin J. Kelly, president, Bell Telephone Laboratories, New York; Dr W. R. G. Baker, vice president and general manager of General Electric Co's Electronics Division; and Dr Reinhold Rudenberg, Gordon McKay professor of electrical Engineering, Harvard University.

Dr Kelly was elected for distinguished service in directing scientific research and contributions to national scientific and military policy; Dr Baker for his technical achievements and administrative leadership in electronics; and Dr Rudenberg for his distinguished record as Gordon McKay professor, and research and design of electric motors, conductors and transient performance of power systems.

Research Group Using 100-W Nuclear Reactor

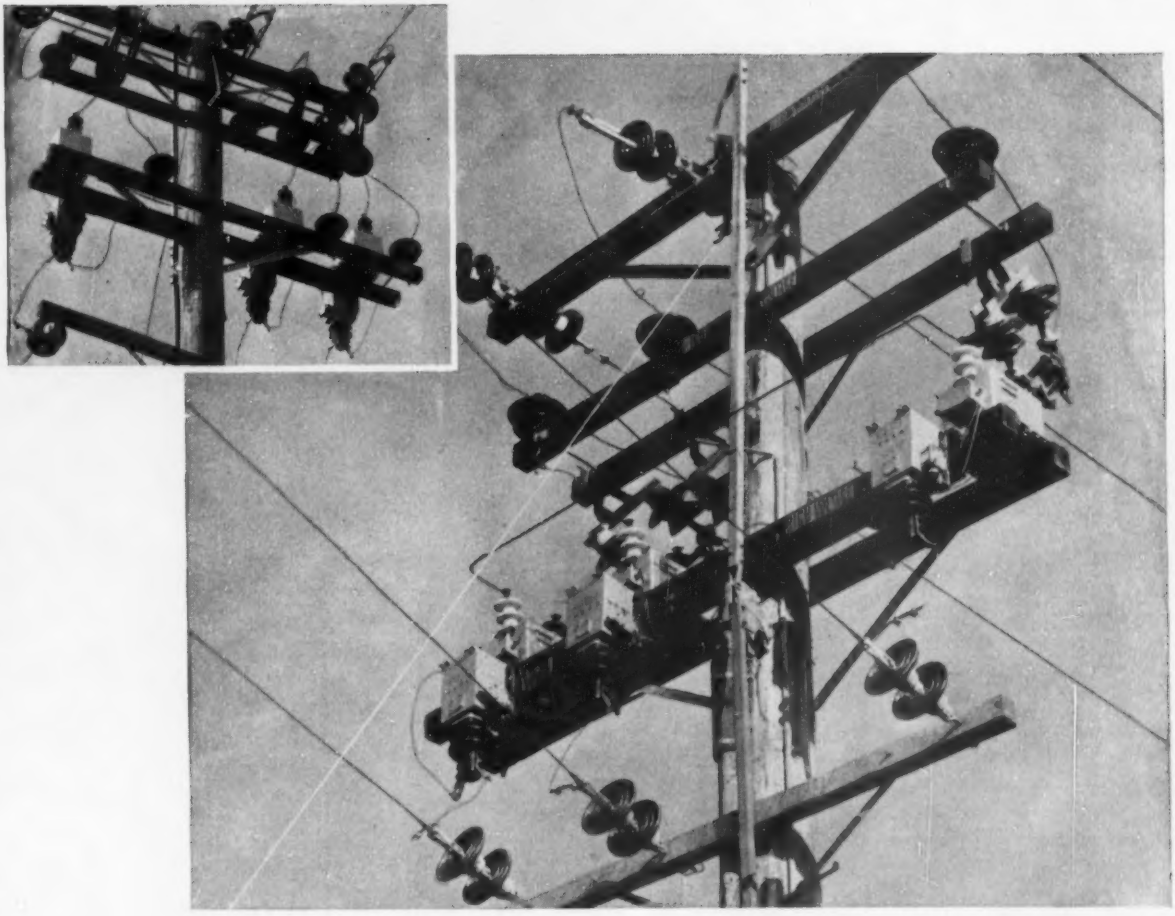
A self-contained water boiler-type atomic energy reactor for special nuclear research has been designed and built by North American Aviation, Inc, for the Atomic Energy Commission. The new reactor now is in operation by the California Research and Development Co, Livermore, Calif., an AEC contractor.

Developing 100 w of power, the reactor is the largest unit of its type to operate with a closed cycle. The reactor, in which fissionable uranium compound is contained in a water solution, is designed to retain all radioactive by-products of the fission process in the unit instead of exhausting them to mix with the open air as in the case of other large reactors of this type. Radioactive by-products in the reactor are processed inside the unit and returned to reactor core.

The reactor will be fueled with uranyl sulfate, enriched in fissionable Uranium 235, in a water solution About four gallons of this material is housed in a steel sphere, 1 ft in diameter. A cylindrical stack of graphite bars, to reflect the neutrons produced by the fission process, surrounds the sphere. This entire assembly is housed in a steel tank 5 ft in diameter and 5 ft high. Two control and two safety rods, made of cadmium and boron, run through the tank to the sphere.

REA Approves Loan

Rural Electrification Administration has approved a $2,780,000 loan for Mississippi Delta Electric Power Association, Greenwood, Miss., to finance construction of 565 miles of distribution line.



They got pole-top neatness...low-cost accuracy... with Westinghouse Transformers!

Above are two views of a Westinghouse Instrument Transformer installation on the Pacific Gas & Electric Company system.

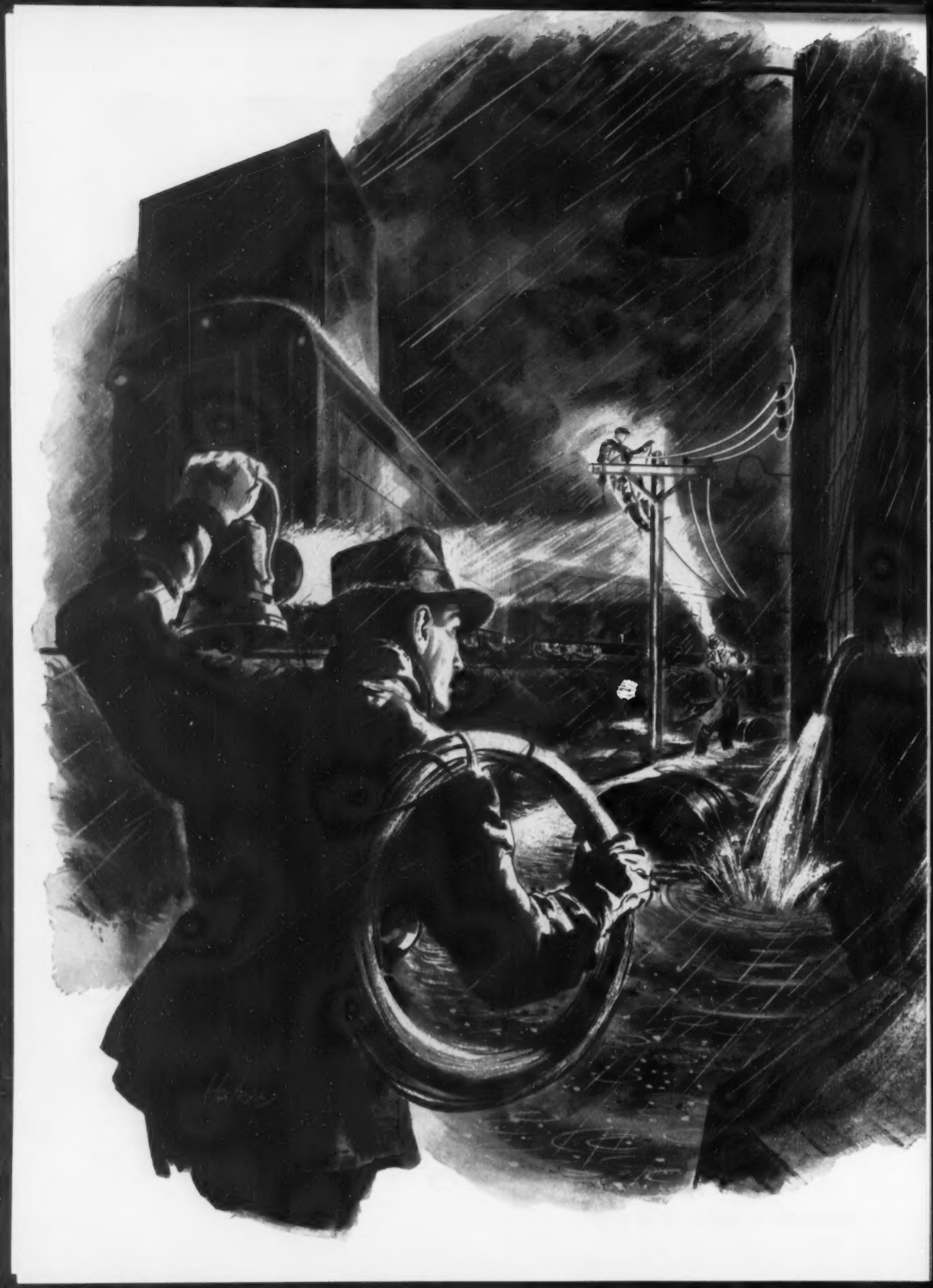
Because they're compact and light, for easy handling in any installation, the mounting problem was simplified. Top, bottom and side mounting positions adapt readily to awkward, close locations. Top-mounted, high-voltage bushings simplify connections. For these reasons, Westinghouse Transformers naturally lend themselves to neatness.

Accurate, reliable measurement results from Westinghouse Instrument Transformers through such design features as plastic impregnation and Hipersil® steel cores. These features keep maintenance at a minimum.

Because he handles the most complete line of instrument transformers in the industry, your Westinghouse representative may be helpful in answering your problems. Call him today, or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa.

J-70666

YOU CAN BE SURE...IF IT'S Westinghouse



WESTINGHOUSE BUILDS FIRST RAIL-MOUNTED POWER PLANT . . .

5000-kw gas turbine goes mobile... to meet emergencies, prevent shutdowns

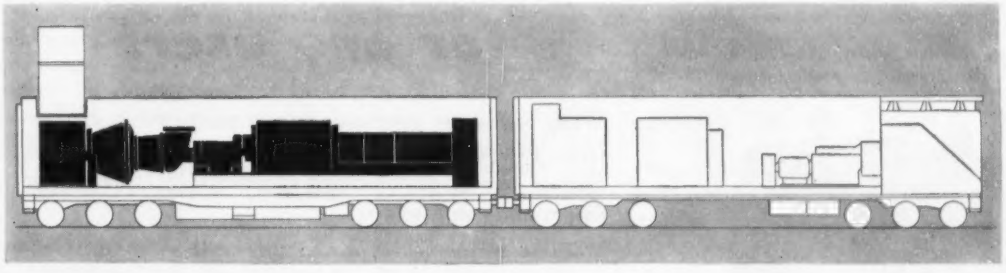
Designed and being built by Westinghouse for the Corps of Engineers, U. S. Army, this plant can deliver 5000 kw and will be used primarily to supply power in theaters of military operations. Complete and self-contained—from prime mover to substation—it can be moved quickly to any location where it may be needed.

Westinghouse made this ultra-compact, mobile-generating plant feasible by utilizing the inherent advantages of gas turbines. Small size and weight require only limited space and no extra structural support. No cooling water is required. These features, together with integral piping, controls and auxiliaries, adapt readily to a completely self-contained plant. In fact, only two connections are required for complete plant operation—fuel in and power out.

This advanced mobile power plant typifies continuing Westinghouse efforts to explore new concepts in electric power generation . . . and its ability to apply gas turbine designs for filling new needs in practical and flexible generation.

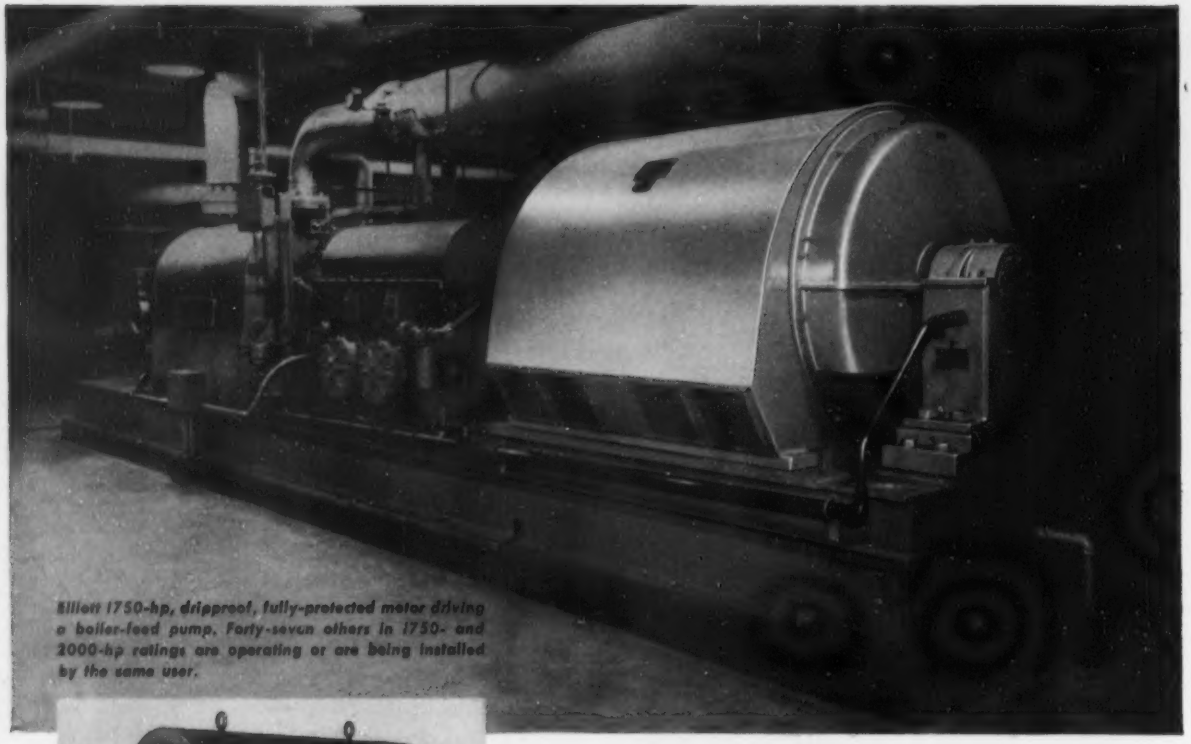
WRITE FOR INFORMATION...

Take advantage of this Westinghouse pioneering and engineering ingenuity. Write for complete information on gas turbines for electric power generation, contained in a new book: *Westinghouse Gas Turbine Power Plants for Electric Power Generation.* Ask for B-5887 from: Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa. J-50566

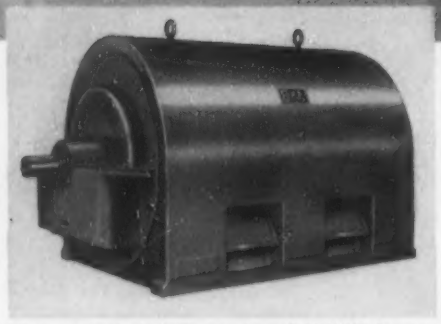


This mobile power plant uses only two, 54-foot cars. One houses the 5000-kw gas turbine generator; and the other, the switchgear, transformer, starting equipment and complete control facilities. A dual-frequency generator and 6250-kva transformer, 2500 to 15,000 volts, provide maximum flexibility.

YOU CAN BE SURE...IF IT'S Westinghouse



Elliott 1750-hp, dripproof, fully-protected motor driving a boiler-feed pump. Forty-seven others in 1750- and 2000-hp ratings are operating or are being installed by the same user.



Elliott two-pole induction motors, 350-4000 hp, are also available with bracket-type bearing construction.

This top air discharge design illustrates the flexibility of Elliott two-pole motor design.

Elliott FABRI-STEEL MOTORS AND GENERATORS

48 large two-pole

ELLIOTT MOTORS

for one user!

When one power generating system purchased 48 of these large, two-pole motors to drive boiler-feed pumps, it was another case of demonstrated confidence in Elliott motor design and construction.

These motors have proven themselves with their exceptionally high efficiency and power factor. With their Fabri-Steel construction, the frame members are joined by the latest welding techniques. This results in high strength and rigidity with light weight. The rigid welded stator frame and bearing bracket construction reduce vibration and noise and maintain uniform air gap. Every motor element reflects this careful engineering and workmanship. Get all the facts in Bulletin PB 7000-1-151. Write Elliott Company, Ridgway, Pa.

ELLIOTT Company

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R3-23

RIDGWAY DIVISION

FOR MOTORS 1-200 HP: CROCKER WHEELER DIV. AMPERE, N. J.

W. F. DUNKLE, Pennsylvania Power & Light Co, discusses the economies offered by bushing standardization at the Doble Conference. Seated (left to right) are G. R. Deinema, Northern States Power Co and chairman of the session, and H. R. Walsh who coordinated the conference

Oil Insulation Standards Urged

Doble tells conference that operating experience should be translated into requirements for new oil

Utilities must establish standards to procure better insulating oil, Frank C. Doble, president, Doble Engineering Co, told clients at its 21st annual conference at Boston recently. Operating experience, he said, should be translated into requirements for new oil. He drew upon recent studies to show how present tests may give misleading results.

Some aromatics act as natural inhibitors to protect oil, he said. These must be retained as fully as possible in refining processes, and protected against oxidation by such additives as DBPC.

Purchase Specifications . . . Purchase specifications for new transformer oils lack the technical niceties which might be expected where so much money is involved, said A. M. Downey, Doble Co. Many purchasers impose no restrictions on chemical content.

E. L. Raab, General Electric Co, conceded that there can be better oil. But it must have insulating, cooling, and dielectric properties suitable for general use. He believes that writing a complete trouble-free specification may be difficult.

Gulf Research chemist, H. A. Ambrose, asserted that oils can be improved if users tell their needs. Both he and Koppers' Gilbert Thiessen look to greater use of additives and continued research to extend useful life. Consulting chemist von Fuchs concurred but asserted that users must help in revising specifications to benefit by recent progress in oil technology.

J. E. Housley, Aluminum Co of America, cited prospects of control of oil deterioration in voltage regulators by alumina treatment with dehydrating breather when quality decline is first indicated.

Reclamation Program . . . Central Maine Power Co's oil reclamation program now requires two commercial purifiers, one truck and the other trailer mounted, reported N. Thurston and W. Lajousky. The latter has a collapsible boom to handle charges up to 810 lb. Valve system is flexible, and transformers 200 ft distant can be readily served. If interfacial tension tests below 18 dynes, it is restored to 25-27 dynes. Average cost of purification in the field is about 20¢ per gal.

Bushing standardization highlighted one session. W. F. Dunkle, Pennsylvania Power & Light Co, declared that manufacturing agreement is difficult but would offer substantial economies to users. American Standards Association sub-committee C-76 is now balloting on proposed electrical characteristics of apparatus bushings from 23 to 287.5 kv and upon standards for lower end and flange dimensions from 23 kv to 69 kv, he said.

Power factor and loss tests provide a reliable basis for detection of insulation aging and deterioration in bushings, declared A. L. Rickley of Doble.

Testing indoors during five winter months, said G. R. Deinema, Northern States Power Co, always reveals some equipment defects due to non-moisture causes. Tests are made on circuit breakers, wall tubes, and potential transformers.

Circuit Breaker Inspection . . . Contact resistance measurements are made on all circuit breaker inspections, said M. E. Willis, Philadelphia Electric Co. Thermal dissipation characteristics of higher voltage outdoor types gives a larger margin of contact resistance values before heating and contact deterioration can develop to the trouble point. Maximum allowable resistance values ranged from 40 to 150 microhms in most 15-kv breakers and from 250 to 300 microhms in 73-kv units. Extended tests reported by W. W. Thompson, Tennessee Valley Authority, emphasized the desirability of investigating breaker condition when contact readings ran from 300 to 700 microhms over a wide range of equipment types and makes.

G. W. King, Consumers Power Co, described an oil circuit recloser maintenance program which has prevented a considerable number of incorrect service operations. Monthly lockouts are tried. After two years' service or else after 100 operations reclosers are removed to the test shop and reconditioned. About 1,000 such devices are used on the system.

Tests on the first 330-kv, 150,000-kva, 3-phase transformers on the Appalachian Electric Power Co system were reviewed by V. W. Brust and J. H. Campbell. Field tests after bushing installation showed 0.3 to 0.4% power-factor. Readings made through capacitance taps were consistent with nameplate readings when the 330 and 132-kv bushings were tied together to eliminate potential difference.

Progress in sound barrier applications was featured by several utility engineers. Such cases require individual treatment and carry a heavy public relations burden. Decibel measurements over affected areas are valuable when made in the small hours. Measurements exceeding 40 db are generally indicative of the need for attention. Wall barriers composed of concrete blocks, transite, or other materials have been found useful.

Elimination of Defective Arresters . . . Successful elimination of defective 3-

One phase of final inspection is the electrical testing, under water, of every foot of Rome RoZone. When the safety gate is lowered, high voltage current is applied to each reel of cable.

8 AWG solid street lighting cable, RoZone insulated with RoPrene (Neoprene) sheath—2001 volts and up.

Rome RoZone®

Superior Ozone-Resistant Insulation Deserves Your CONFIDENCE

What Its Uniformity Means to You...

Q: What is meant by uniformity?

A: Uniformity in service performance . . . foreknowledge of dependability, carrying with it the assurance that every length of RoZone insulated cable measures up to the same high standard of quality.

Q: Of what advantage is such uniformity?

A: Every time you install RoZone, you can be sure of identical performance under comparable service requirements.

Q: How does Rome Cable control uniformity?

A: By carefully supervised workmanship, backed by rigid manufacturing specifications and long experience in the exact compounding of quality insulation.

Q: How do we measure uniformity?

A: Through long-time laboratory and service tests, as well as a specially developed ionization level test which actually predetermines the insulation's behavior in service. Further, sampling tests for ozone resistance, electrical stability in water and aging properties are standard procedures.

In short, RoZone is a premium insulation, precisely compounded, manufactured on modern equipment, time-proven in service and step-by-step tested for high *uniformity of quality. It deserves your fullest confidence.*

It Costs Less to Buy the Best

RoZone is approved and accepted by leading utilities, industrials and consulting engineers

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kv lightning arresters from reclaimed stock was reported by L. M. Partridge, Public Service Co of New Hampshire. Procedure involves these steps:

1. Inspection for broken housings and obvious defects.

2. Withstand test at 4,500 v, 60 cps. Current flow indicates probable radio interference.

3. Breakdown test at 12 kv, 60 cps. Failure to pass current indicates less ability to protect transformers.

4. Leakage test at 2,400 v, 60 cps. Currents exceeding 25 micro amp indicate internal moisture, shorted gaps, and other defects.

Dielectric loss measurements were advocated by A. L. Rickley, Doble, to detect dirt and defective insulation in lightning arresters. Low test voltages are advantageous, he said, as they tend to accent the defect.

Shunt Capacitors . . . Potential hazard to shunt capacitors when switched during low temperature periods was noted by L. M. Donahue, Central Vermont Public Service Corp. Askarel solidifies below O F, and any voids established at low temperature require heating above 55 F to clear completely. His survey of manufacturers indicated that capacitors should be energized at least 45 min every 6 hr at O F, or every 3 hr at −30 F. Lacking this, special low temperature units can be used or means provided to heat their housings.

Cables and accessories featured the closing session. H. L. Garton, Commonwealth Edison Co, cited the usefulness of radar type tests to locate cable faults. Each change of cable size produces an echo, but faults can be picked up within 100 to 150 ft. Paper insulated supervisory cables give better echoes than power cables.

Victor Siegfried, American Steel & Wire Co, emphasized importance of corona cutting in rubber insulated and thermoplastic types of cable. Absorption of ultraviolet light offers a favorable test technique. Siegfried advocated better identification of shielding tapes for the benefit of line crews, and extending drain wires past manholes.

Utility to Enlarge Plant

Central Louisiana Electric Co plans to add a 54,000-kw unit to its recently completed Teche Power Station at Baldwin. The addition will cost $6.1 and is scheduled to go into operation in May 1956.

23 Utilities Designated as 'Excellently Managed'

Twenty-three electric utilities have been certified by American Institute of Management, New York, as "excellently managed."

Of those named, eight received the award for the fourth consecutive year. These are: Boston Edison Co, Cleveland Electric Illuminating Co, Consolidated Gas, Electric Light & Power Co of Baltimore, Consumers Power Co, Detroit Edison Co, Ohio Edison Co, Pacific Gas & Electric Co, and Tampa Electric Co.

Receiving the award for the third time in as many years were American Gas & Electric Co and Cincinnati Gas & Electric Co.

Seven companies received the award for the second time: Commonwealth Edison Co, General Public Utilities Corp, Iowa-Illinois Gas & Electric Co, Kansas Power & Light Co, Texas Utilities Co, Southern California Edison Co, and Virginia Electric & Power Co.

Companies receiving the designation for the first time from the institute included: Atlantic City Electric Co, Idaho Power Co, Montana Power Co, Pacific Power & Light Co, Pennsylvania Power & Light Co, and Union Electric Co.

The institute said purpose of the awards is to focus attention upon companies with superior management in the hope of improving corporate practices generally throughout the country.

In the evaluation of a company's management, the institute considers ten factors: economic function, corporate structure, health of earnings growth, fairness to stockholders, directorate analysis, research and development, fiscal policies, production efficiency, sales vigor, and executive evaluation.

POWER BRIEFS FROM THE NEWS

● Nathaniel Washington, attorney for Grant County, Wash., PUD, has been elected chairman of a partnership organization for developing power formed by 14 Washington State PUD's and seven cities last month. The group still must submit a formal application to the State Power Commission to get approval for their new group—Washington State Operating Agency No. 1.

● In answer to a charge made by Sen Estes Kefauver (D-Tenn.) that Idaho Power Co is owned by easterners, T. E. Roach, president of the utility, said in a letter to the senator that the majority of Idaho Power owners live in 11 Western states. To support his statement, Roach cited these figures from an October 1953 share-owners analysis: 59.48% live in 11 Western states and 40% of the total in Idaho and Oregon.

● Douglas County PUD of Bridgeport, Wash., has applied to Federal Power Commission for a permit to make preliminary engineering studies of Wells Dam site on Columbia River 51 miles upstream from Wenatchee, Wash. Puget Sound Power & Light Co last month applied for permission to develp the site.

● Construction budgets of electric utility companies for 1954: Alabama Power Co, $34 million; Carolina Power & Light Co, $25,665,000; Pennsylvania Electric Co, $30 million; Southern Co, $75 million; Kentucky Utilities Co, $13.5 million; and Public Service Electric & Gas Co, $80 million.

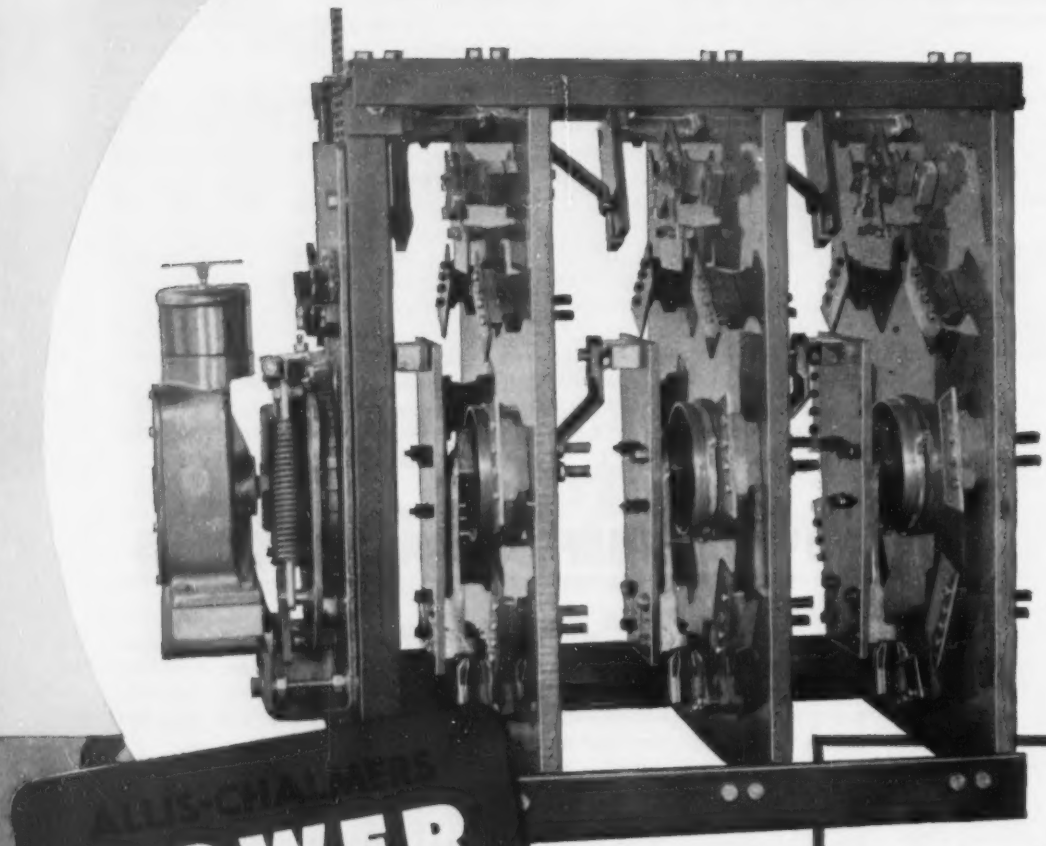
● Federal Power Commission has issued a preliminary permit for development of a hydroelectric site in Alaska to Grant Lake Electric Power Co, Inc, Anchorage, for a proposed 4,000-hp project on Grant Creek and Grant Lake on the Kenai Peninsula.

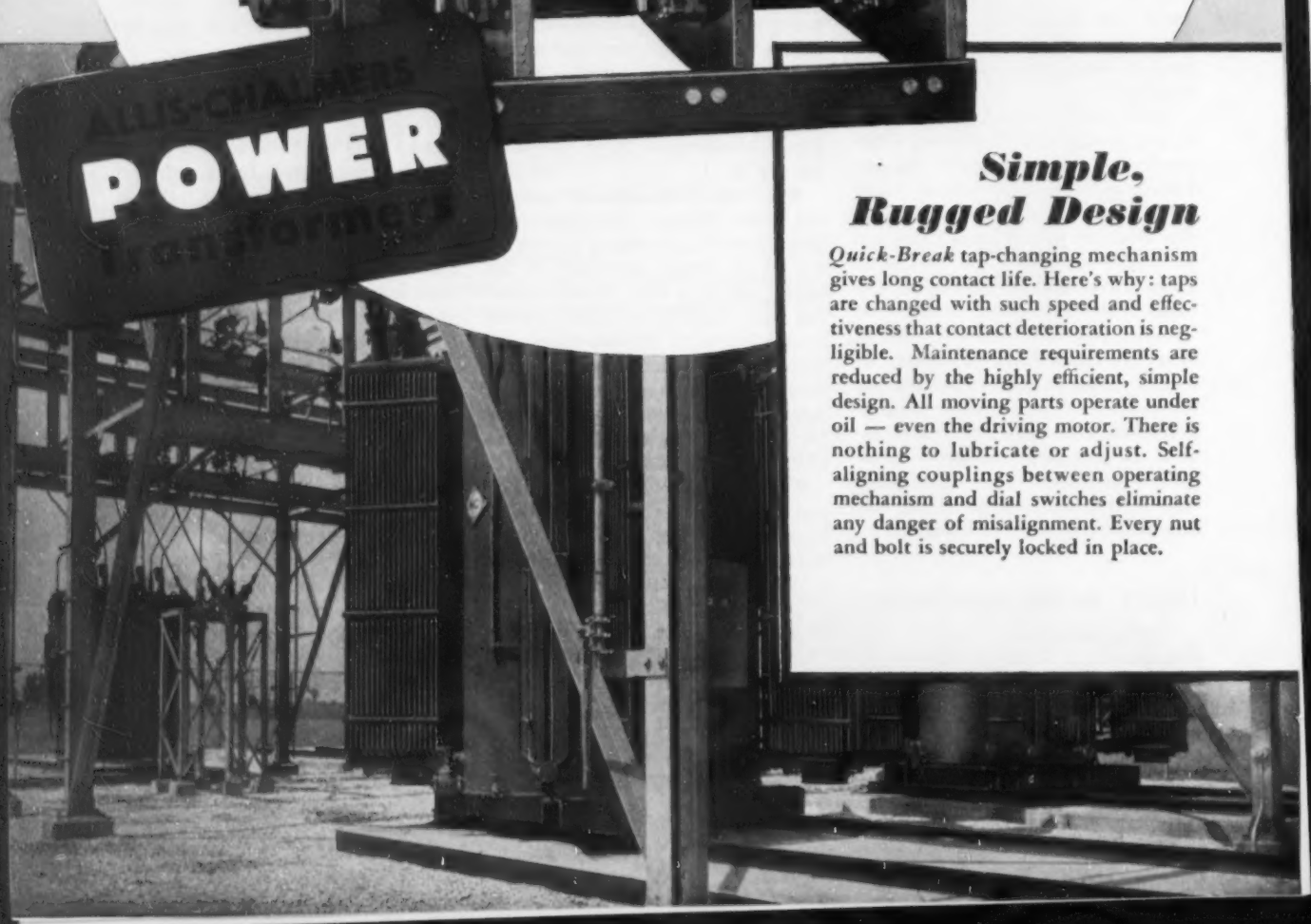
● Stevens County (Wash.) PUD recently won the right, for the second time, to condemn properties of Washington Water Power Co when a superior court judge approved a certificate of necessity in favor of the PUD. Hearing to determine the valuation of WWP properties in the county will not be held before December. In 1948 Stevens PUD won a similar court award but could not raise the $2.5 million that a jury set as the value of the WWP properties.

● Southern Colorado Power Co will start work soon on a $3-million addition to its steam plant at Canon City Colorado.

● Public Service Co of Colorado placed in service last month a 10,000-kw addition to its Alamosa, Colo., steam plant. This raises the plant's capacity to 20,000 kw.

20 Years'





Simple, Rugged Design

Quick-Break tap-changing mechanism gives long contact life. Here's why: taps are changed with such speed and effectiveness that contact deterioration is negligible. Maintenance requirements are reduced by the highly efficient, simple design. All moving parts operate under oil — even the driving motor. There is nothing to lubricate or adjust. Self-aligning couplings between operating mechanism and dial switches eliminate any danger of misalignment. Every nut and bolt is securely locked in place.

Field Proof-

Here's the Tap-Changing-Under-Load Mechanism That Has Given 20 Years of Unequalled Performance

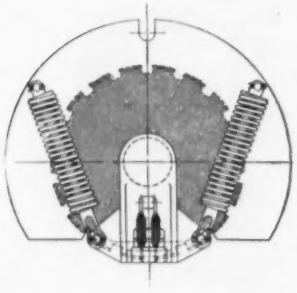
Field-proved — and unsurpassed in twenty years — that's the story behind Allis-Chalmers famous *Quick-Break* tap-changing mechanism. No other tap changer on the market gives you its combination of ruggedness, accuracy, and simplicity — features that add up to practically trouble-free operation.

Laboratory-proved — tests show that the *Quick-Break* mechanism will withstand 5 million operations — equivalent to over one hundred years of normal service. The *Quick-Break* mechanism was designed to operate under the most difficult conditions. After twenty years of field operation, it is still the simplest, most efficient means of changing taps under load.

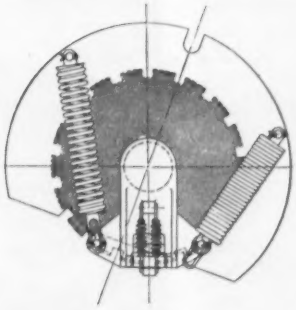
Get More Facts. If you don't have all the facts already, it will pay you to get more details by contacting your nearby Allis-Chalmers office or writing Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4193

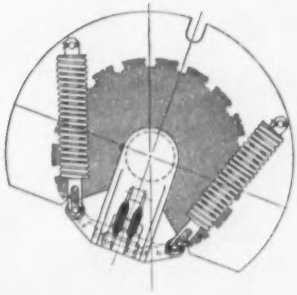
How It Works



1 Dial switch operates on the balanced spring principle. Components include outer moving segment, inner stationary index plate, and powerful springs for fast drive snubbing action.



2 Start: driving motor rotates outer segment but latch on crank arm holds tap switch in position. Heavy-duty springs store energy to produce quick start and stop of switch.

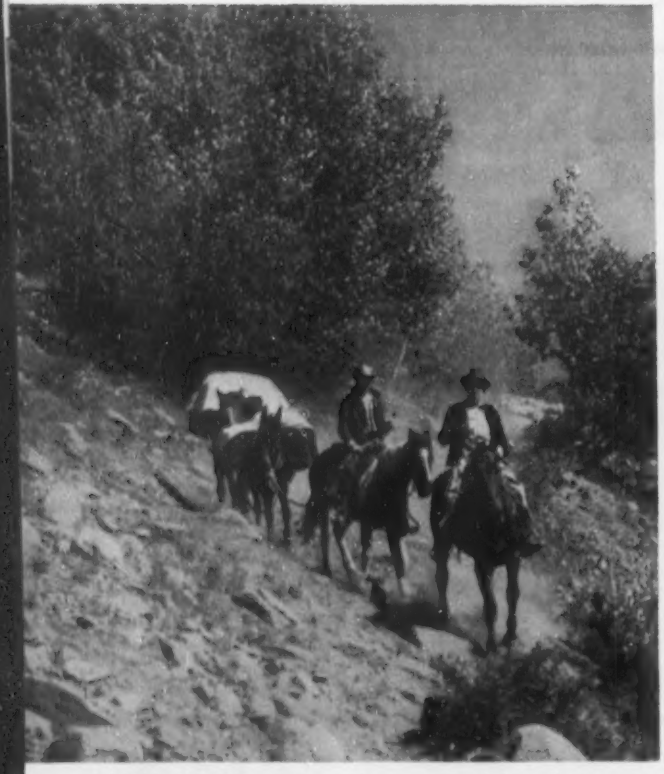


3 Finish: cam on segment lifts latch. Released spring tension rotates switch swiftly to next operating position. Latch locks switch and places mechanism in position for next change.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

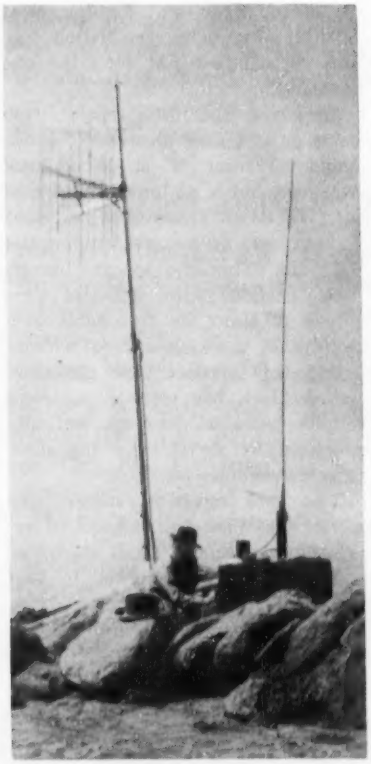
'Hot' Cobalt . . . . . Helps Engineers



CORPS CREWS traveled two days over mountain trails to get to snow gage locations. Region is 50 miles northeast of Fresno, Calif.

DATA REPEATER was set up at relay station on 10,050-ft Spanish Mountain, halfway between two gage sites and Pine Flat base station

Predict Runoff from the Sierra Nevadas



ENGINEER at relay point contacted crews at snow gage locations to check the system

Army Corps installs telemetering system in Kings River watershed to determine water content of snow on remote slopes above the federal government's Pine Flat Dam

The time is approaching—rapidly—when a system operator will be able to determine water content in snow packs on remote slopes without stepping out of his office. Army Corps of Engineers recently took a giant step in that direction when they installed a telemetering system for radioactive snow gages in the Kings River watershed on the west slope of California's Sierra Nevada mountains. Runoff from the area will be controlled this spring by the Engineers' Pine Flat Dam, expected to go into operation soon.

Because of the system, operators at Pine Flat will have much more up-to-the-minute information with which to regulate the reservoir in anticipation of the spring runoff. The system will transmit by radio indications of water content in snow at two locations to a receiving station just above Pine Flat. Signals will be fed into an electronic computer that indicates water content by counts per minute.

Planned in High Sierras . . . Technique of using radioactive snow gages and telemetering system was born at the Corps' Central Sierra Snow Investigation Laboratory at Soda Springs, Calif., near famous Donner Summit. Under the leadership of Dr. R. W. Gerdel, application was made of Lambert's Law regarding intensity of radiation from a radioactive element passing through an absorbing medium. Putting the law to practical use, water equivalent of snow will be expressed in terms of measured attenuation of radiation passing through the snow pack. What makes the application even more valuable is that readings can be translated into amount of water in watershed, which is the desired quantity, and not merely into depth of snow pack in watershed.

Radioactive snow gages and telemetering system will make possible a more accurate method of forecasting spring runoffs by taking into account

RADIATION COUNTER hangs over "hot" cobalt pipe; transmitter antenna is at left

COBALT SNOW GAGE is calibrated for the location with lead weights to simulate snow

DATA TRANSMITTER is adjusted before telemetering system is checked with base

BASE STATION above Pine Flat Dam houses radio receiver, tele-decoder, electronic counter

runoff potential at higher elevations. At present, limited information for forecasts is gathered by several methods and pooled by California's Cooperative Snow Surveys. Monthly data is gathered laboriously from established snow courses by men on skis who measure water content of snow pack. Limitation of this method is that it is nearly impossible to get to elevations above 9,000 ft.

Use of snow markers and aerial photography by California Electric Power Co (EW, April 13, 1953, pp 22-23) and others is an attempt to overcome this limitation. However, this scheme provides only measurement of depth of snow pack and not of water content.

Locations picked for installation of the telemetering system are at mountain basins known as Woodchuck Meadows and State Lakes, high in the upper reaches of Kings River watershed. Because rugged terrain rules out direct line-of-sight transmission to Pine Flat, a repeater station is required on 10,050-ft Spanish Mountain to relay signals. These locations will provide the best index for areas about which little is known. Index represents data that cannot be obtained any other way. Furthermore, data will be obtained daily as compared with monthly bulletins.

Works This Way . . . The snow gage consists of a heavy lead tube planted in vertical position flush with ground. In lower end of tube two units (40 millicuries) of cobalt 60 have sufficient strength to penetrate and measure snow depth equivalent of 55 inches of water. This amount of cobalt retains half-life after 5.3 years. Therefore, decay corrections within one winter season are negligible. Cobalt 60 provides radiation of steady intensity (essentially monochromatic), required condition for satisfactory operation.

A lead cap that screws on the lead tube was used to reduce radiations below danger level while the gage was transported and placed in the ground. The cap will be screwed over the pipe during summer months to protect animals and humans that may wander into the area. Additional protection—for literate humans—is afforded by a sign that warns of radioactivity.

The lead tube directs a stream of gamma rays from the cobalt so that at 15 ft above ground principle energy is contained within a 1.5-ft circle. Within this area a Geiger-Mueller tube is suspended from steel-pipe gallows frame. Structure was built 18 ft high and 20 ft between uprights to minimize interference to natural settling of snow over the gage. Pipe for the gallows was threaded in 5-ft sections so that it could be carried by pack train.

G-M tube is used as radiation detector because it has short "dead time," or lapse between responses, requires low operating voltage, and is stable and rugged enough for outdoor use. Output of the tube is cabled to a telecoder, which converts pulse signals into a modulated signal of 8.5 and 10 kilocycles. Signal from the telecoder is fed to radio transmitter which broadcasts it to Pine Flat receiving station via the Spanish Mountain relay.

Before engineers left snow gage sites, they calibrated instruments by placing lead plates of known thickness over cobalt tube to simulate water content of snow packs. Readings at both snow gage locations were then transmitted to the receiving station to calibrate and check entire system.

Automatic Relay . . . Equipment at Spanish Mountain relay station consists of standard FM receiving and transmitting sets.

In actual operation, repeater will come on at 8 am and operate for two hours. Transmitter at Woodchuck Meadows comes on for seven minutes at 8:20 am. Transmitter at State Lakes comes on for seven minutes at 9:25 am. Thus the repeater covers both locations with sufficient time spread to allow for reasonable gain or loss in clocking system without overlap of signals. After the relay station clock has turned on power supply, the transmitter is automatically energized by signal from the snow gage transmitters.

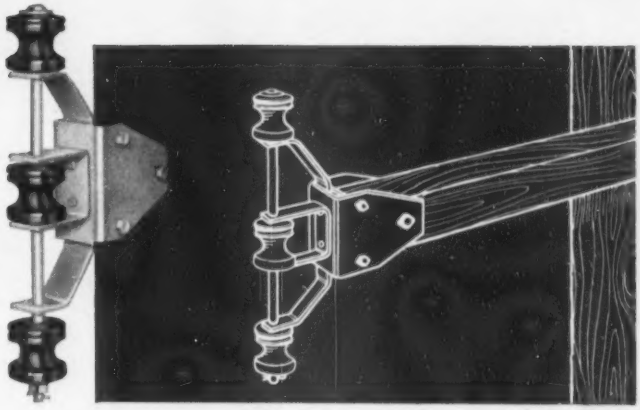
The base receiving station just above Pine Flat dam consists of receiver, tele-decoder and electronic counter. Signals are picked up and translated into and registered as counts per minute. Based on calibrations made at snow gages sites, these indications will be converted directly into inches of water. Equipment at base station temporarily is housed in a wood shelter. Plans call for this station to be moved to the Pine Flat control room at a later date.

LINE CONSTRUCTION BLUEPRINTS

HOW SOME UTILITIES ARE MAKING CONSTRUCTION WORK EASIER . . .
IN WAYS THAT MAY BE HELPFUL AND USEFUL TO YOU.

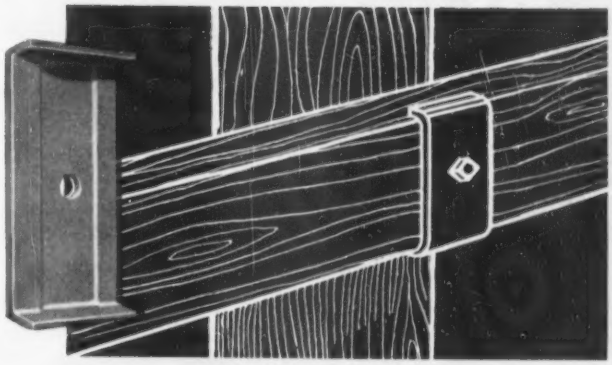
CROSSARM END RACK

Designed to take 3-wire service leads directly from the end of the secondary crossarm. Tends to conserve pole space and clean up overcrowded poles—without impairing climbing space. Heavy galvanized steel. 5/8" button-head thru-rod. Cat. No. 330073B1.



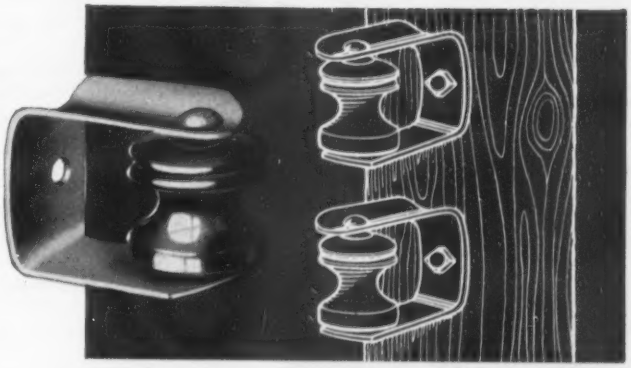
CROSSARM REINFORCING PLATE

For use over crossarms with crossarm mounting bolts to make doubly sure that the arms won't split or check. Heavy 3/16" steel, 3 1/8" wide by 8" long, thoroughly galvanized, with 3/4" offset angle end and 13/16" diameter hole. Cat. No. 323489X1.



SINGLE SPOOL SECONDARY RACK

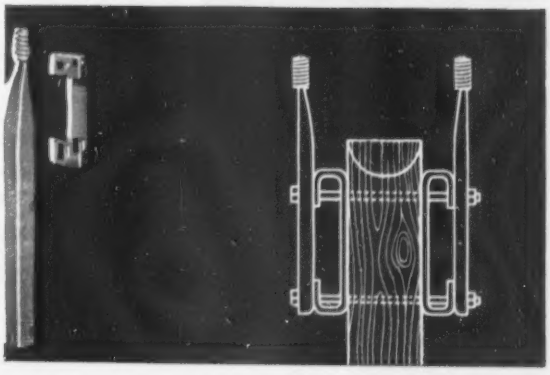
Heavy gauge steel strap base 3" wide, with 4" length from pole to 5/8" steel insulator pin. Base is curved to fit the pole, insuring a good, rigid installation. Available with or without wet or dry process spool insulators. Cat. No. BA25X7 (without insulator).



POLE TOP PIN and MOUNTING BRACKET

A strong pole top pin and a companion extension bracket that can be mounted singly or in pairs. The pin is No. 8 gauge steel. Transverse loading, 1500 pounds, longitudinal loading, 1200 pounds. Cat. No. 317011B1.

Bracket is 1/4" steel; gives 2" extension from pole. Bolt holes and slots accurately match the pin. Cat. No. 211048A1.



Do you have a line construction problem?

These are just a few of thousands of L-M line construction specialties. If you have a problem, let us know. We may have standard or special items in stock that will solve it. Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

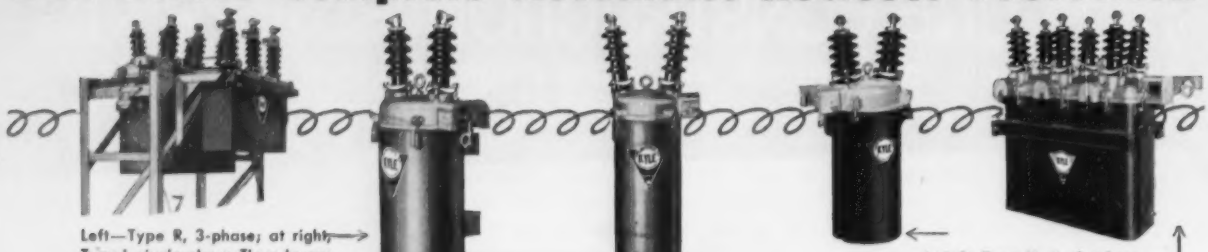
LINE MATERIAL

Line Construction Materials

Complete Coordinated Equipment for Distribution Today

107

L-M Offers Complete Automatic Recloser Protection

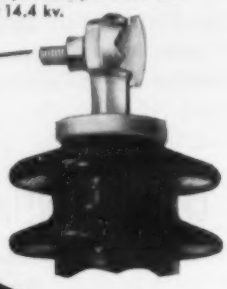


Left—Type R, 3-phase; at right, Type L, single-phase. These heavy duty reclosers have interrupting capacities of 6000 amperes at 4.8 kv, 4000 at 14.4 kv.

Type E—intermediate duty single-phase recloser interrupts up to 2500 amperes at 14.4 kv, 1750 amperes at 23 kv.

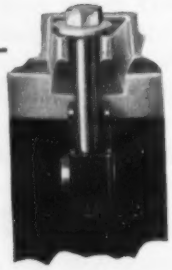
At left, Type H, single-phase; at right, Type 3H, three-phase recloser. These units provide interrupting capacities up to 1250 amperes at 14.4 kv.

With the units shown in the illustrations above, Line Material provides complete, coordinated automatic protection from substation to load—for single-phase and three-phase lines. This complete protection helps maintain service continuity, and cuts service calls by eliminating fuse blowing by temporary faults.

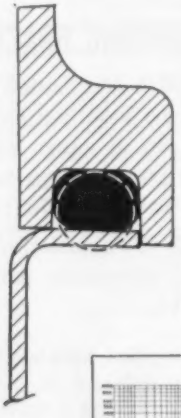


Plated universal terminals for copper or aluminum, No. 8 to 2/0. No loose parts to fall off.

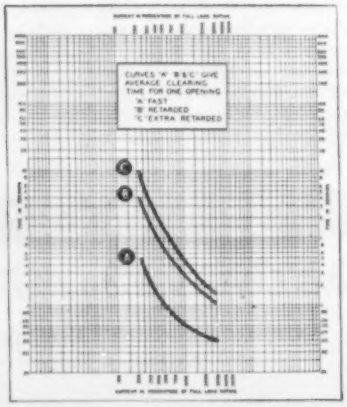
Clamp-on bushings, easy to replace in case of accident.



Head may be rotated to desired position.

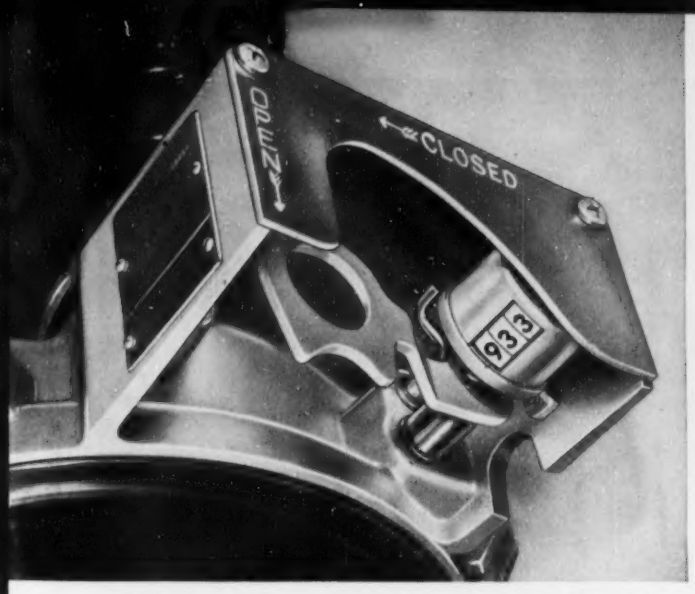


Soft O-ring type Buna-N oil-proof rubber gasket completely contained and held under proper pressure against tank rim by deep groove.



Only KYLE Reclosers Offer 3 Curves, 7 Sequences

Kyle Reclosers offer the widest choice of time-current curves and operating sequences. You can select from Curve A, fast; B, retarded; C, extra-retarded. Choice of seven sequence combinations. Coils and sequences can be quickly changed, right in the field.



The sleet hood is large, well proportioned. The counter has been improved. It has larger figures that are easier to read.

Optional non-reclosing device. With lever down, recloser opens once, does not reclose, for greater safety in hot-line work.

L-M's Kyle® Type H Reclosers Offer New Features For Greater Convenience

by **R. C. KIRK,**
Manager,
Kyle Products Sales,
Line Material Company

Perhaps one of the reasons for the wide leadership of Kyle Reclosers is the close attention we have always given to product performance *and* convenience for the operating man. In line with this policy, further improvements have been made in the Kyle Type H, the world's largest-selling oil circuit recloser.

New clamp type bushings are now being used. These make bushing replacement easy in case of accident. Universal terminals are plated for use with both copper and aluminum.

Tank cover clamping and gasketing have been improved to take full advantage of latest gasketing materials. The head is larger, smoothly contoured, with a large lifting eye. Gasket is now a soft O-ring of oil-proof Buna-N rubber, contained in a deep groove which keeps the gasket under controlled compression against the tank rim. Lips on the groove keep the gasket from falling out when head is raised.

The tank itself is slightly larger. Oil capacity has been increased to 4¼ gallons. This, plus the use of ORTO®, L-M's inhibited transformer oil, is extra oil-life insurance.

Sleet hood is larger. Figures on the counter are larger and more legible. The non-reclosing device, shown above, is now available as optional equipment.

Interrupting ratings have been rounded off so that they are all 25 times the coil size. This represents no appreciable change, as there is still a very large margin of safety in Kyle design.

Advantages of Recloser Operation

The use of Kyle Automatic Reclosers helps maintain continuity of service, because the recloser eliminates a large majority of the faults that blow fuses. This cuts service trips, and eliminates the risk of upsetting coordination by installing the wrong size fuse.

Kyle Reclosers themselves offer many advantages. Their operation is accurate and dependable, in all kinds of weather. Kyles provide positive toggle action, fast opening and closing. They do not depend on gravity, motors, or clockwork. Kyles offer a wide choice of time-current curves and operating sequences. Coils and sequences are easily changed, right in the field!

The Kyle hydraulic mechanism is simple, troublefree. Thousands of Kyles are in regular operation from the tropics to Alaska. More than 100,000 Kyle Type H Reclosers prove the value and dependability of the Kyle operating principles.

Ratings of Kyle Type H Reclosers

Coil Rating, Amperes	Minimum Tripping Current, Amperes	Interrupting Ratings,* Amperes, 14.4 kv
5	10	125
10	20	250
15	30	375
25	50	625
35	70	875
50	100	1250

*Symmetrical RMS Amperes at maximum phase to phase nominal voltage of 14.4 kv. Interrupting ratings are based on a maximum test circuit X/R ratio of not less than 8 and the asymmetrical rating in total RMS amperes is 1.4 times the symmetrical ratings given in the table.

Get Information on Complete Coordinated Automatic Protection

L-M offers a complete line of reclosers and sectionalizers to provide complete, coordinated protection—single- and three-phase—from substation to load.

Ask the L-M Field Engineer for information and bulletins on Kyle apparatus—or write Mr. Kirk at Line Material Company, Milwaukee 1, Wis. (a McGraw Electric Company Division). 161

LINE MATERIAL
Kyle® Reclosers

WHY SHOULD YOU PAY FOR THIS?

You can eliminate the high cost of maintaining large stocks of conductor by using your Kaiser Aluminum distributor's warehouse *as your own inventory.*

He can give you dependable delivery *as your schedule calls for it* on a complete line of Kaiser Aluminum conductor. He has available the largest range of sizes and construction of covered aluminum wire in the industry. This means your overhead costs for storage space can be reduced to a minimum, which means more profit for you.

EXTRA SERVICE TO YOU!

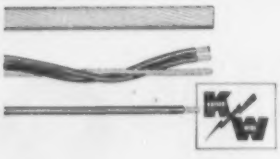
He also offers his experience and specialized knowledge to help solve your individual problems, makes available top-notch engineering services, helps you keep abreast of latest developments and techniques, gives you friendly, personal attention on any size order.

Get in touch with your nearby Kaiser Aluminum distributor *now.* Refer to the list at the right and your local telephone directory. Kaiser Aluminum & Chemical Sales, Inc., Oakland 12, California.

Kaiser Aluminum Distributors conveniently located to serve you:

Line Material Co.
General Electric Supply Co.
Westinghouse Electric Supply Co.
Capital Electric Supply
Central Electric Supply Co., Inc.
Champion, Inc.
City Electric Distributors, Inc.
Crescent Electric Supply Co.
Dauphin Electrical Supplies
Dutton-Lainson Co.
Electrical & Mechanical Supply Corp.
Eoff Electric Co.
Evans Electrical Supply, Inc.
Florida Electric Supply, Inc.
George H. Wahn Co.
Hampden Electric Supply Co.
Hunzicker Brothers
Interstate Electric Co. of Shreveport, Inc.
Maydwell & Hartzell, Inc.
Nelson Electric Supply Co.
Price Electric Co.
Russell Belden Electric Co.
S. M. Supply Co., Inc.
Southern Minnesota Supply Co.
Stuart C. Irby Co.
Stubbs Electric Co.
Tafel Electric & Supply Co.
The Korsmeyer Co.
Virginian Electric, Inc.
Waltrip Electric Co.

Kaiser Aluminum



setting the pace—
in growth, quality and service

Solid and Stranded Neoprene and Polyethylene Covered Conductor
Self-Supporting Triplex Cable • ACSR • All Aluminum Conductor

CHILLER for drinking water in top of door with tap outside and dispenser for ground coffee kept cold and fresh are featured by Crosley in new refrigerator line

UPSIDE-DOWN design with freezer section at bottom is Admiral's contribution to refrigerators

KITCHEN CABINET type refrigerator, shown by GE, was given thorough lookover. Last year it appeared only in mock-up; this year a working model was brought forth

WHAT'S COOKING in the oven is easy to see without stooping in the L&H "Custom-Built" range

1954's Appliances Make Their Bow

Color television, room air conditioners and new features in ranges, refrigerators and freezers made the news at the January Appliance Show held in Chicago Jan. 4-15th.

All major TV manufacturers were demonstrating color TV although few were quoting prices. Prices quoted were in the $1,150 to $1,250 range.

J. B. Elliott, vice president, Radio Corporation of America, predicted that 100,000 color TV sets would be produced in 1954, but said production would not get under way until March with 1,000 sets produced in that month. Picture size of the initial sets, he said, will be 11½ to 12 inches. Elliott was speaking at the Merchandise Mart press conference on appliances.

At the same conference, P. S. Smith, president, Norge Division, Borg Warner Corp, said the appliance business should be better in 1954 than in 1953 but that it will have to compete with other consumer goods for the public's dollar. His prediction was based on the premise that even if business in general levels off slightly, the appliance industry will claim a larger share of money spent.

The air conditioning business will break all previous records in 1954, John M. Bickel, vice president, Carrier Corp, told the press conference. He predicted a 30% increase in 1954 room air conditioner sales over 1953, a total estimated volume of 1,200,000 units. He estimated that there would be 100,000 central air conditioning systems installed in homes in 1954 and that sales of this equipment by 1963 should reach a million.

Fewer models of each major appliance appeared to be the general

HEATING IS ADDED to some room air conditioners by resistance elements and to others, like this GE unit, by reverse cycle operation

PULL-OUT SHELVES and more room to store the family groceries in the Westinghouse refrigerator are pointed out by representative

rule of all manufacturers. Purpose was reduction of inventories.

Practically all manufacturers were showing leader models at prices lower than lowest priced models of recent years. Stepped-up selling was theme.

Touches of color were also noted in many refrigerator and range models. In refrigerators the color was chiefly interior plastic trim although some models had limited amounts of color on exteriors.

Ranges . . . Built-in equipment was featured by Hotpoint and by L & H. This included ovens built into cabinet space and raised high enough above the floor so that the housewife can look into the oven without stooping. Surface units were built into the cabinet surface at normal work level, allowing storage space below.

Admiral and Hotpoint showed some models with motor-driven spits for turning meats while roasting.

General Electric offered a double-oven-model with one 14 inch and one 21 inch oven.

For the first time Hotpoint included two ovens and a deep well on the same model. A plug-in griddle, large enough for 12 hamburgers, was another Hotpoint feature.

Controlled and faster surface units were shown by a number of manufacturers.

Frigidaire featured seven ways of cooking without additional pots or pans.

Refrigerators . . . General Electric's wall-cabinet style refrigerator, shown last year as a mock-up, now appeared as a working model. It is not in production yet and probably will not be until late in 1954 or early 1955.

Revolving shelves, pull-out shelves and removable shelves were featured by various manufacturers, for easier access to foods. General Electric's revolving shelf was adjustable as to height on the spindle. Admiral showed an "upside down" refrigerator with the freezer section in the bottom.

Crosley featured a water chiller with tap on front of door. A gage shows water level in the chiller. Crosley also showed a coffee dispenser in which ground coffee is kept fresh in the refrigerator.

Room Air Conditioners . . . Supplementary heating is a feature in a number of room air conditioners. This is provided in reverse cycle units by General Electric, Admiral and Servel while heating elements are incorporated in some Frigidaire and Westinghouse models.

Crosley units featured push-button control and an automatic turn-on-turn-off mechanism that would cool at a pre-determined time.

Kelvinator displayed an agitator-type automatic washer with an eccentric agitator with rubber baffles.

Norge automatic washers are made portable this year, on casters.

INFRARED ROTISSERIE cooking is incorporated in Hotpoint's new 30-inch range. The roasting meat revolves on a motor-driven spit installed in space alongside the conventional oven

for the first time

PROOF

HD

KEARNEY

Specify

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JAMES R. KEARNEY CORPORATION

4224-42 Clayton Ave.,
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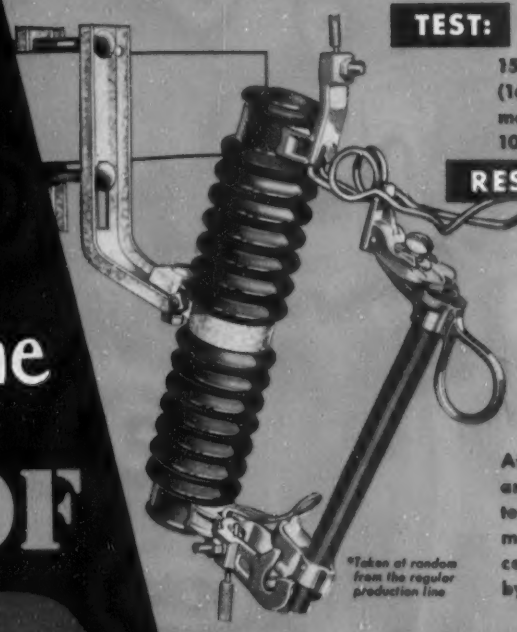
Canadian Plant: Guelph, Ontario



*Taken at random from the regular production line

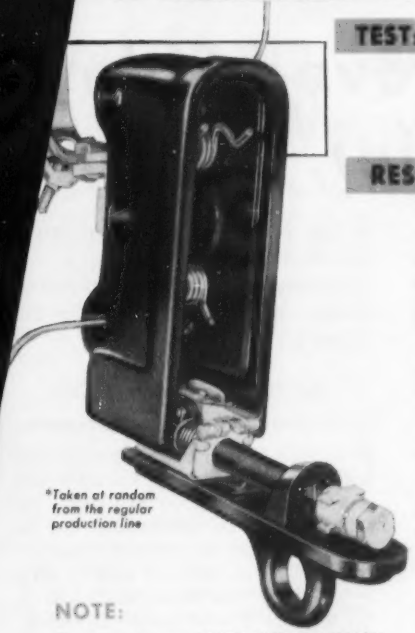
TEST: A standard, 100 ampere, 15 KV HEAVY DUTY TRIP-OUT* (16234-3) was subjected to faults made on the 15 KV side of a 10,000 KVA transformer.

RESULTS: At 14.4 KV with a 20% power factor, the cutout successfully interrupted six shots ranging from 7620 to 8750 amperes, RMS. After the sixth shot, the cartridge and contacts were carefully examined and found to be in perfect working condition.

After the short circuit test, without any adjustment, the cutout was tested for temperature rise. The maximum found was 13°C., as compared to the 30°C. allowed by NEMA on new cutouts.

FIELD TESTS DEMONSTRATE

Ample Heavy Load Interrupting Capacity of KEARNEY Heavy Duty Cutouts



*Taken at random from the regular production line

TEST: Two standard, 100 ampere, 5 KV TRIP-O-MATICS* (indicating 12143-20 and non-indicating 12143-21) were subjected to faults on the 5 KV side of a 10,000 KVA transformer.

RESULTS: At 5 KV with a power factor of 20%, the indicating Trip-O-Matic successfully interrupted nine shots, ranging from 5500 to 6350 amperes, RMS, at 5046 volts. Three additional tests were made on the same box with a new door installed, successfully interrupting 5800, 5750 and 6050 amperes. The non-indicating Trip-O-Matic successfully interrupted four shots ranging from 2800 to 6000 amperes.

After the short circuit test, a heat run was made on the same non-indicating box. Maximum temperature rise was found to be 21° C., as compared to the 30° C. allowed by NEMA on new cutouts.

These test results are proof-positive that Kearney cutouts protect your circuits with *even greater* capacity than their normal ratings.

NOTE:

These reports are NOT BASED ON CALCULATION! They are the results of actual field tests at Kearney's 34.5 KV substation. Power was taken from the Union Electric circuit providing a 445,000 KVA backup.

JAMES R. KEARNEY

FOR BETTER CONSTRUCTION • FOR SAFER MAINTENANCE

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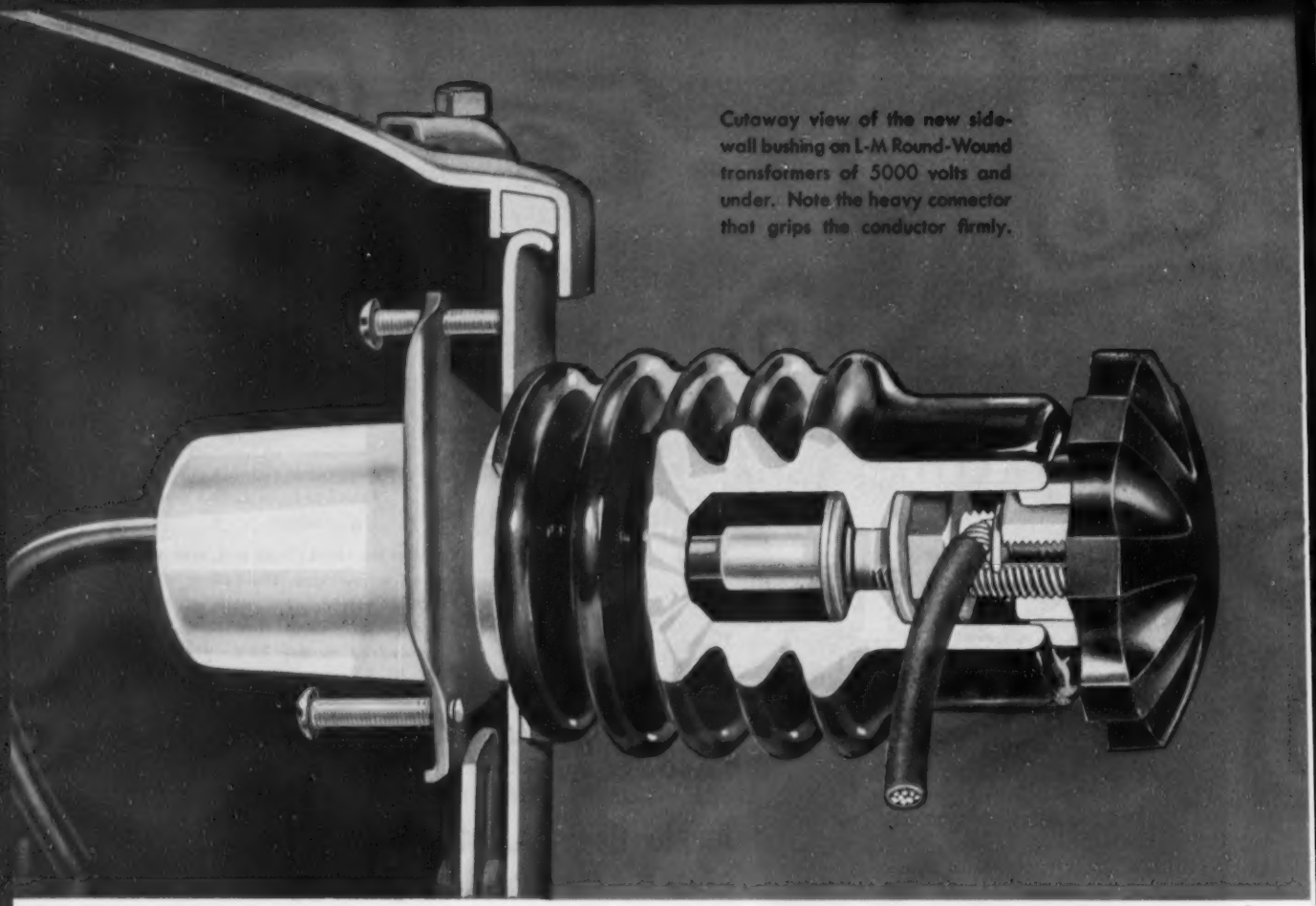

Cutaway view of the new sidewall bushing on L-M Round-Wound transformers of 5000 volts and under. Note the heavy connector that grips the conductor firmly.

L-M's Improved Sidewall Bushings Assure Safer, Faster Installations

L-M's new sidewall transformer bushings permit building transformers lower and lighter, so they require less pole space. These bushings are standard on all transformers of 5000 volts and below.

The bushings have been improved, to make connections faster, safer, and easier. Linemen will like these new bushings, and will be able to make transformer installations in less time.

Bushings are wet process porcelain. Knobs are made of a specially developed thermo-setting phenolic resin plastic modified with a rubber filler. This combination assures unusual resilience and toughness.

Knobs are large, giving plenty of leverage. Even with gloved hands the lineman gets a firm grip, so that finger-tightening is all that's necessary for a permanent connection.

The heavy connector grips the conductor firmly. The bushing will accommodate a range of conductors from *one* of the smallest to *two* of the largest EEI-NEMA-Standard sizes.

Bushing design is leak-proof and inherently siphon-proof; moisture can't be drawn in; oil can't seep out.

Get Full Information About L-M Round-Wound Transformers

In addition to their outstanding performance characteristics, L-M Round-Wound distribution transformers have many desirable features like this bushing. Get the whole story from the L-M Field Engineer; or write for Bulletin DT1. Line Material Company, Transformer Division, Zanesville, Ohio (a McGraw Electric Company Division).

Corners of the indentations in the plastic knob are sharply molded to provide a firm grip even for gloved hands. Knob does not come off accidentally, but can be removed for inspection.

"Round-Wound" is a Line Material Company trademark

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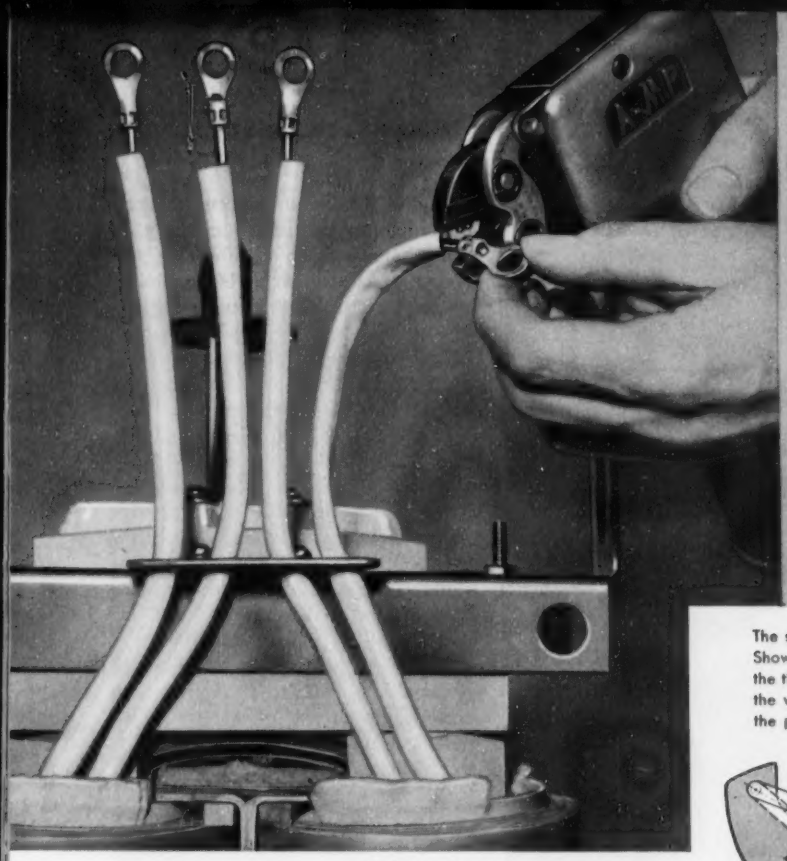
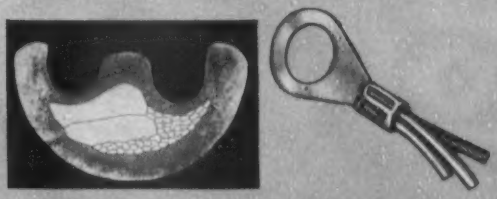
LINE MATERIAL Transformers



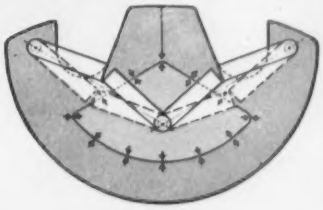
Connections are made by pneumatic hand tools which automatically put the proper pressure on the swaged joint. The W-crimp forms all strands and terminal into substantially one solid, low-resistance piece of metal.

Two solid wires secured in one terminal. As shown in the cross section, the copper fills the entire area, and any relaxation of the copper simply tightens the connection.



Two solid and one stranded wire secured in one terminal. All three are firmly held. The joint has less resistance than the conductors themselves, the wires cannot loosen, and the joint remains completely free from corrosion.

The sketch illustrates the "locked lever" principle utilized in the W-crimp. Shown outlined by solid lines are imaginary toggle arms which represent the theoretical condition existing prior to making the crimp. After crimping, the wire is locked in position by the deformed terminal, as illustrated by the position of the phantom toggle indicated by the broken lines.



Note how the toggle action of the W-crimp prevents the conductor from assuming its original shape, and any tendency toward cold-flow actually increases the pressure between the conductor and the terminal connector. The arrows indicate pressure exerted between the conductor and the connector.

W-Swaging Assures Strong, Corrosion-Proof Connections on L-M Round-Wound Transformers

by **R. W. BECKER**
Manager
Quality Control Department
Transformer Division
Line Material Company

Internal connections in our transformers must be strong, have low resistance, and be corrosion-proof. Some years ago we conducted extensive experiments with the usual methods—soldering, brazing, welding, and with a variety of swaged connectors.

Finally we standardized on the W-crimp type of swaging, a development of the Aircraft-Marine Products Company. L-M was the first transformer manufacturer to use this improved method. In nearly six years of use we have had practically no complaints because of connector failure.

In the W-crimp which we use, advantage is taken of the tendency of copper to "relax"—to resume its original form. After being deformed by the action of the precisely controlled indenting tool upon the connector and conductor, the conductor tends to cold-flow. However, through the scientific "locked leverage" principle utilized in the design of the terminal indentations, forces due to cold-flow in the conductor are so restrained that contact pressures are increased, and the resistance of the joint actually becomes lower as the swaged connection ages.

The advantage of this type of swaged connection is especially important where solid conductors are joined. These often show a tendency to loosen with other styles of crimped connections. Stranded conductors, relatively simple to join by other pressure-type connectors, are even more satisfactorily joined by W-crimps.

Principal advantage to the user of Round-Wound transformers is that he need not worry about internal connections. They do not pull out or break, even under most adverse conditions. The wire is not weakened by crystallization because no heat is required to make the joint. They do not corrode. There is no radio noise problem. Resistance is as low as, or lower than, the resistance of the wire itself.

This is one of many quality "extras" that may not be seen by the user but that have helped build the fine reputation of Round-Wound transformers for performance and long life.

Get Details on Construction of L-M Round-Wound Transformers

Ask the L-M Field Engineer for a copy of Bulletin DT1, which describes the manufacture of "Round-Wounds" · or write Line Material Company, Transformer Division, Zanesville, Ohio (a McGraw Electric Company Division).

"Round-Wound" is a Line Material Company trademark

LINE MATERIAL
Transformers

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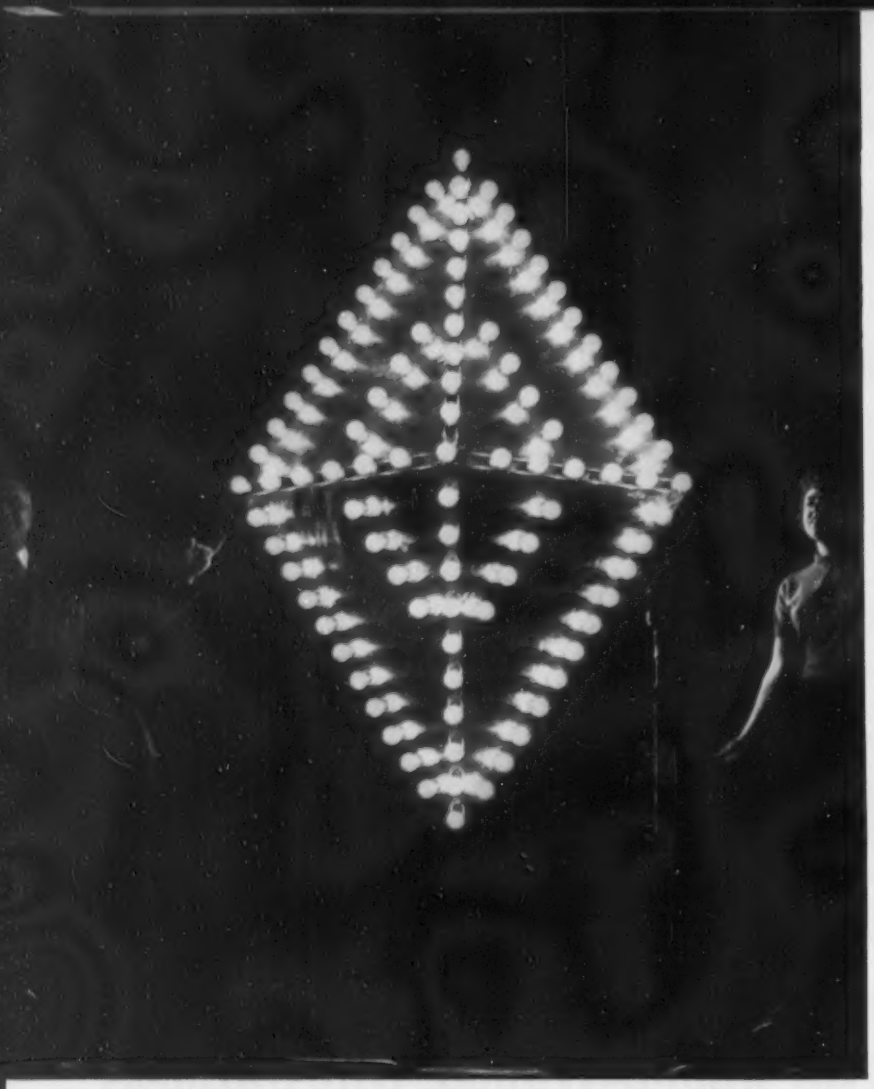
Electrical



Symbol of Light's Diamond Jubilee sparkles on stage at close of lighting presentation

Irate home owners descend on builder because of poor lighting in houses he sold to them

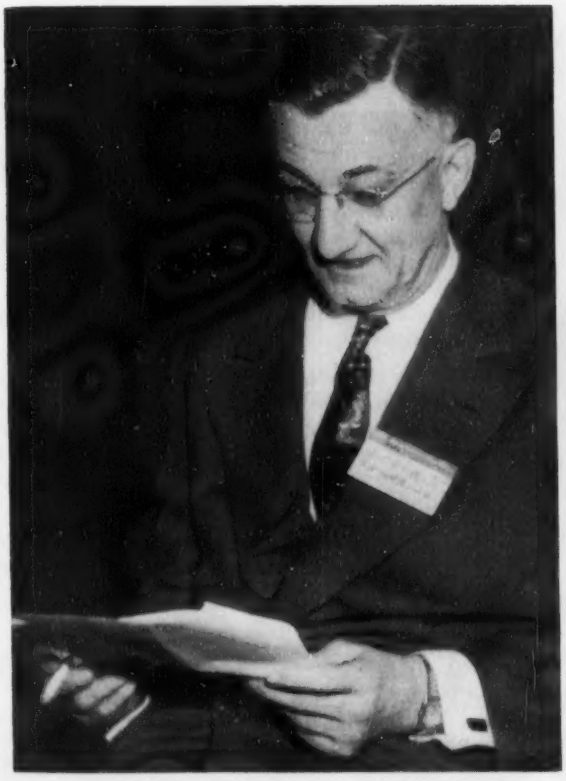
Light's Diamond Jubilee, modern home lighting and adequate wiring all were impressed on members of the National Association of Home Builders on January 18, the first day of the 1954 convention of the Association in Chicago. This was done by two presentations, professionally staged and acted. The first was entitled "The Builders Jubilee with Light" and the other "Electrical Angles of 1954."

The lighting show was sponsored by a committee made up of representatives from the General Electric Co, Westinghouse Electric Corp, Sylvania Electric Products Inc, and the Edison Electric Institute. The show was staged by Theatre for Industry, a producing organization for industrial presentations. The plot revolved around the dream of a speculative builder in which he was tormented by the deficiencies of lighting in the houses he had built and who learns that modern lighting will make his houses more salable. And seeing the light, both figuratively and literally, he joins in with the celebration of Light's Diamond Jubilee.

How a young couple learned the hard way that electrical living requires plenty of wiring was the theme of "Electrical Angles of 1954." They stumbled through a tangle of extension cords, discovered that television and the comfort of cool air are impossible of enjoyment at the same time, replaced fuses continually, experienced all the vexations and exasperations of inadequate wiring. This skit was staged by Andelin Associates under the sponsorship of the National Adequate Wiring Bureau.

The pictures on these pages, except for the Jubilee "diamond," were taken during the dress rehearsal period the day before the presentations. Seeing the rehearsal confusion comprised of directors barking at actors, script authors agonizing, industry people fearing the worst, one would never believe that the two shows would run off as smoothly, snappily and effectively, as they did the next day.

Living Values Shown to Home Builders



With corrugated brow and moving lips, Carl Bremicker, Northern States Power VP, narrator of the wiring show, studies his lines

In a huddle, Jimmy Dexter, director, Clara Zillesen, script writer, and Frances Armin, advisor, confer on "Electrical Angles of 1954"

"Get tangled up in the cords," Clara Zillesen tells actor Ward Ohrman

Octopus outlet convinces young marrieds they need adequate wiring

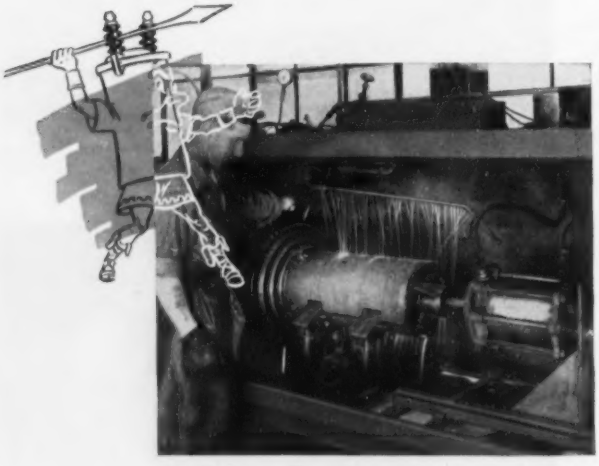
MOLONEY *HiperCore* BEST

The *"better performance"* that has come to be expected of Moloney HiperCore Distribution Transformers is not the result of chance. Rather, it is the result of long experience in the engineering, design and manufacture of transformers. This experience applied, resulted in the design of the HiperCore Transformer. Thorough testing of pilot models resulted in the transformer you receive when you order HiperCore.

But—this alone is not enough! To be sure that you get *"superior performance"* Moloney maintains a constant check during all stages of manufacture so that you know your HiperCore Transformer has been checked and double checked to insure the best operating performance possible.

Briefly, here are the testing steps every HiperCore Transformer undergoes before leaving the Moloney factory:

After the core-and-coil unit is assembled with necessary tap changers and other internal accessories, the completed unit is again tested.



All Moloney Transformer Tanks are individually pressure tested in a special spray machine before painting to make sure that they have no leaks.

MOLONEY ELECTRIC COMPANY

Manufacturers of Power Transformers • Distribution Transformers • Load Ratio Control

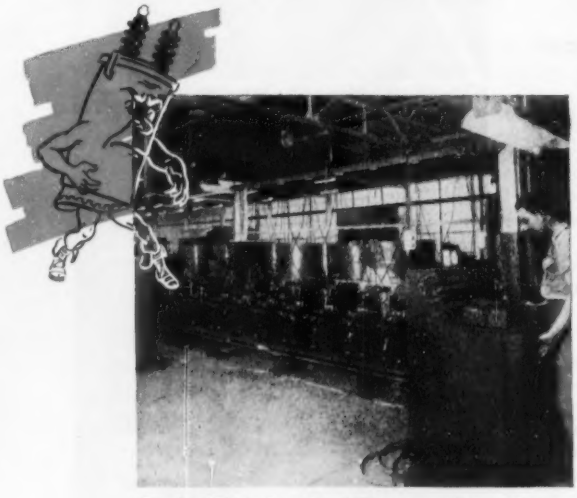
FACTORIES AT ST. LOUIS 20, MISSOURI AND TORONTO, ONTARIO, CANADA

DISTRIBUTION TRANSFORMERS

BY TEST!

Each HiperCore coil is tested for the proper number of tums in each winding and each tap position before it leaves the winding department.

After cores are wound on automatic winding machines, they are annealed and impregnated, and then tested for hysteresis and eddy current losses both before and after they are cut.



Final, NEMA Standard Tests on all transformers; no load loss, exciting current, polarity check, ratio check, dielectric tests. Transformers above 200 Kva also receive load loss, impedance, temperature rise tests.

ME52-30

A 3,600,000 volt surge generator, capable of applying surges equivalent to the most severe that will be encountered in operation, was instrumental in the development of the HiperCore design. Periodic sampling tests are made of transformers from the production line to insure quality control.

Because these tests are standard in the manufacture of HiperCore Transformers, they offer the following advantages:

1. **Surge-proved core-and-coil design**
2. **High short-circuit strength**
3. **Greater short-time overload capacity**
4. **Longer operating life**
5. **Less maintenance**
6. **Better voltage regulation**

Specify* MOLONEY *for better performance!

Transformers • Step Voltage Regulators • Unit Substations

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Florida Power & Light mobile generating plant equipped with Wagner Power Transformers.

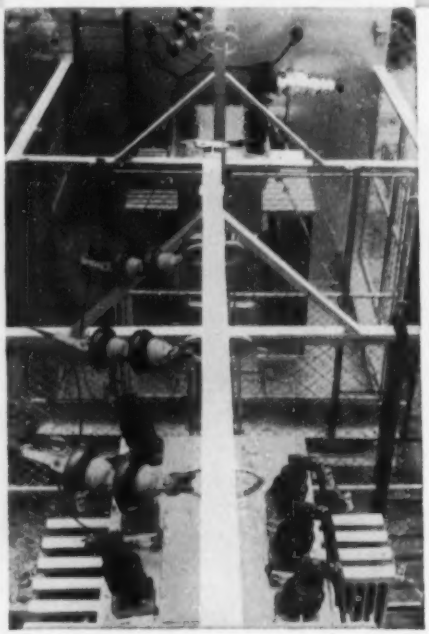
clear the track for Sunshine Service

Power's on the move in fast-growing Florida, as evidenced by this unique, modern generating-plant-on-wheels operated by Florida Power & Light Company.

Mounted on a special 74-foot former circus train flat car, it is one of two such plants designed by FP&L engineers to supply quick emergency or auxiliary electric power wherever required in the Company's state-wide system. It has served both storm-damaged areas and thriving new resort communities like Naples, Florida, where seasonal tourist influxes call for sharply increased electric service.

The self-contained plant is designed for continuous operation if necessary and connects with all FP&L power supply facilities. It is equipped with a 1000-horsepower Diesel engine, a 700-kilowatt generator, and Wagner variable-voltage Power Transformers, delivering voltages from 2,300 to 13,200 volts.

Here is further proof that meeting unusual electric requirements comes easily with Wagner. Whatever the problem, Wagner has the *right* answer. Let a skilled Wagner engineer discuss your needs with you. Contact the nearest of our 32 branch offices, or write us direct.



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BRAKE SYSTEMS—
AIR AND HYDRAULIC

W734-1

How to Connect Aluminum

Time and use are needed to evaluate an aluminum joint. Even accelerated ageing tests will not always tell the story. These suggestions for making aluminum connections are based on the experience of people who have been using aluminum for years:

1. Don't ring conductor insulation with a knife. Whittle it off as though sharpening a pencil. This reduces the possibility of nicking the outside strands. Aluminum cable is more vulnerable than copper cable to breakage caused by nicks.

2. Clean aluminum conductors and connectors before making connections. Scrub through oxide inhibiting grease with a wire brush or emery cloth. Never scrape the cable with a knife. Leave a generous coating of grease on the cleaned surface to prevent reforming of aluminum oxide and to seal out moisture. Some utilities believe it advisable to unstrand cable in order to clean the inner strands.

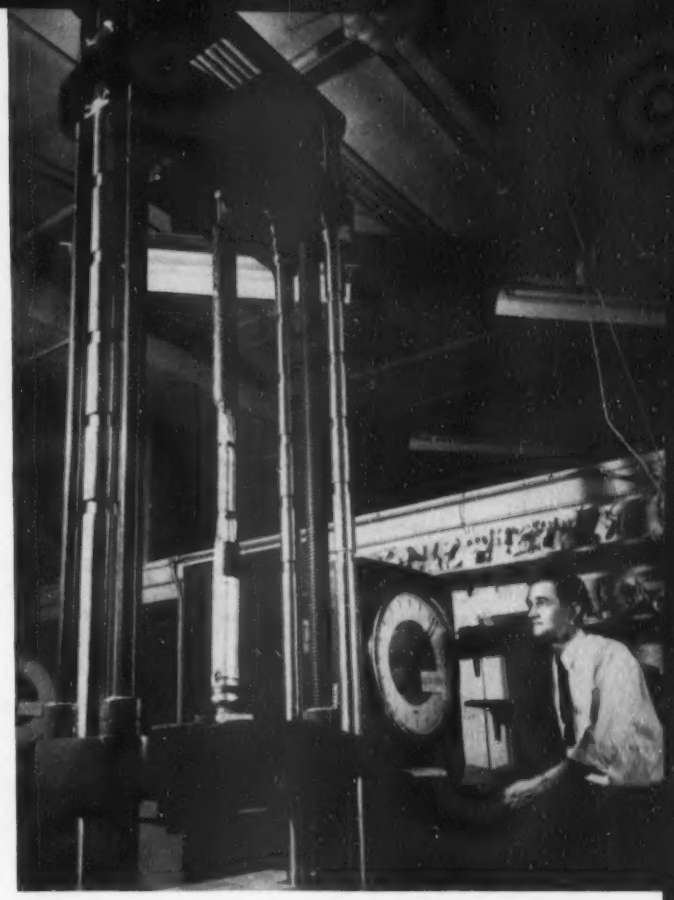
3. Repeat the application of compound coating and scrubbing each time a lug is rebolted to a bus bar.

4. Wipe petroleum base compounds from insulation. These compounds cause rubber to swell and deteriorate.

5. Don't clean plated fittings with a brush or emery cloth. This will remove the plating.

6. Tighten bolted fittings evenly and thoroughly because they don't make good joints on aluminum connections unless pressure is well distributed.

7. Protect comparatively soft tongues of aluminum terminals with large flat washers between the tongues and bolts or nuts. Washers distribute pressure and maintain conductivity. Springwashers overcome expansion problems and promote good electrical joints.



LABORATORY TESTS, such as heat cycling, strength, and corrosion, prove pressed aluminum best for aluminum to copper connections

For Al-Cu Connections . . .

Pressed Aluminum Proves Best

Laboratory tests and survey of utility experience conducted by Thomas & Betts show advantages when properly designed and installed over many other types of connectors

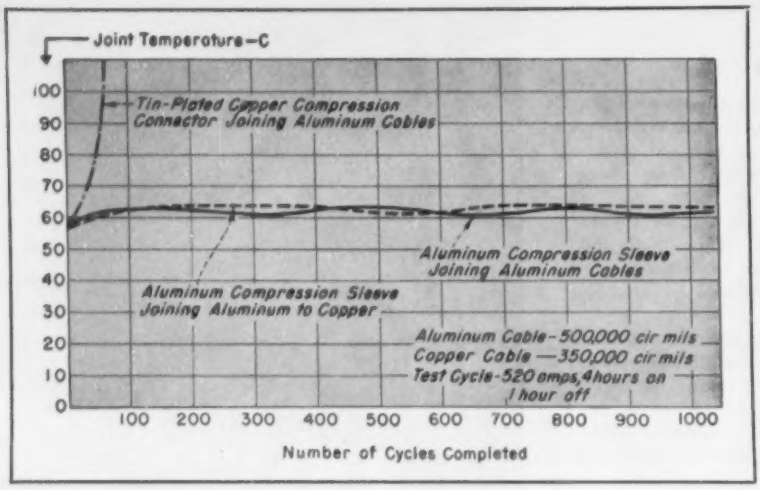
MARTIN D. BERGAN, Director of Research, Thomas & Betts Co, Elizabeth, N. J.

Compression-type aluminum connectors make the best aluminum to copper joint. Tin plating improves conductivity, and inhibitor compounds protect the joint from corrosion. These are the conclusions of laboratory tests and a survey of utility experience conducted by Thomas & Betts Co. Key factors in these conclusions are the thermal expansion properties of aluminum and copper, electrolytic corrosion, property designed connectors, and good installation practices.

Thermal Properties . . . One reason for not connecting aluminum cable with copper connectors, designed solely for copper cable, is that aluminum expands and contracts about 38% more than copper. A copper connector may confine and prevent aluminum from following its natural expansion rate.

As temperature increases, aluminum cable expands more than the copper connector. Resulting pressures squeeze the softer aluminum like toothpaste in a tube, reducing the cable's diameter, causing some extrusion, and resulting in a loose, high-resistance joint after cooling. The process is repeated each time the joint's temperature changes, effects are cumulative, and joint failure is the eventual result.

Aluminum Best Known . . . On the other hand, aluminum is the best known fitting material for connecting copper to aluminum. A tight joint between the aluminum connector and copper cable is maintained by the copper's elasticity and relative high



HEAT CYCLE TESTS show that the aluminum compression type of fitting whether used on copper or on aluminum cable performs in far superior fashion to tin-plated copper connector

resistance to flow and because the aluminum connector is free to expand and contract.

Tests Prove Aluminum Performance . . . High performance of aluminum compression connectors on copper cable was proved by laboratory tests. These were made with aluminum connectors on copper and aluminum cable and with tin-plated copper connectors on aluminum cable. After 1,000 heat cycles—each cycle being 520 amp for 4 hours on and 1 hour off—performance of the aluminum connector joints was equal and satisfactory.

Tin-plated copper compression connectors on aluminum cable failed early and rapidly. This shows that aluminum encased in copper does not have the elasticity to maintain a tight connection.

These tests were verified by the experience of a number of utilities. In one type of installation a utility employed plated-bronze connectors with a resulting low failure rate. However, some failures were rather costly; so the utility switched to aluminum parallel-groove connectors.

Copper Connectors Must "Breathe" . . . Copper connectors may be used successfully to terminate aluminum cable only if the design compensates for thermal expansion and the joint is protected against corrosion. One method of overcoming the expansion problem incorporates a spring action that allows the connector to "breathe" during heat cycling. Thus, the copper follows the expanding or contracting aluminum, maintaining a tight connection at all times.

Unequal expansion of aluminum and copper is not so critical when connecting aluminum terminals to copper bus. In such installations problems of contact disturbance are minimized by the large flat surfaces and the solid bus bar.

Lugs should be bolted firmly to the bus under large washers so that the pressure is distributed over the large tongue area. This minimizes creep or flow. A spring-washer positioned between the flat washer and the nut helps compensate for expansion and promotes a good electrical joint.

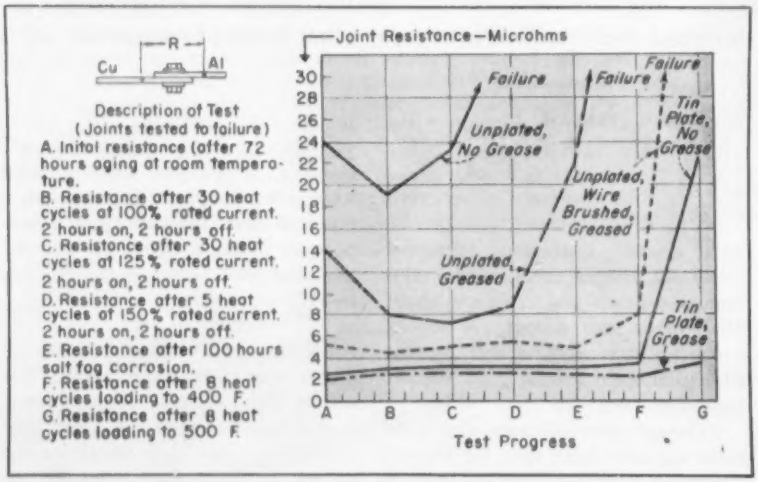
Aluminum Corrosion . . . Electrolytic corrosion occurs when two different metals, such as aluminum and copper, contact in the presence of moisture. A miniature electric cell is created that can generate up to two volts. One of the metals is eaten away like the zinc positive plate in a wet battery.

In the case of a copper connector on an aluminum cable the latter is corroded because it is the more positive metal. This damages electrical properties of the conductor and may appreciably reduce the cable's strength.

When an aluminum connector is on a copper cable, corrosion is less severe because of the relative masses of the two metals. Corrosion that does occur is limited to a small part of the connector instead of the cable.

Tin has been found to be a good contact metal for aluminum to copper joints. It provides a lower resistance contact than when aluminum and copper are connected without it, permitting higher current service. When tin is plated on aluminum, oxides are prohibited from forming. Cadmium plating forms a relative high resistance surface film and is not recommended for use as a contact material.

For butt splicing aluminum to copper cables an aluminum connector should be used. In most cases the end intended for the copper cable has a heavily tin-plated copper sleeve pressed into the aluminum sleeve to serve as a buffer. On outdoor installations and in moist areas aluminum cable should be positioned above the

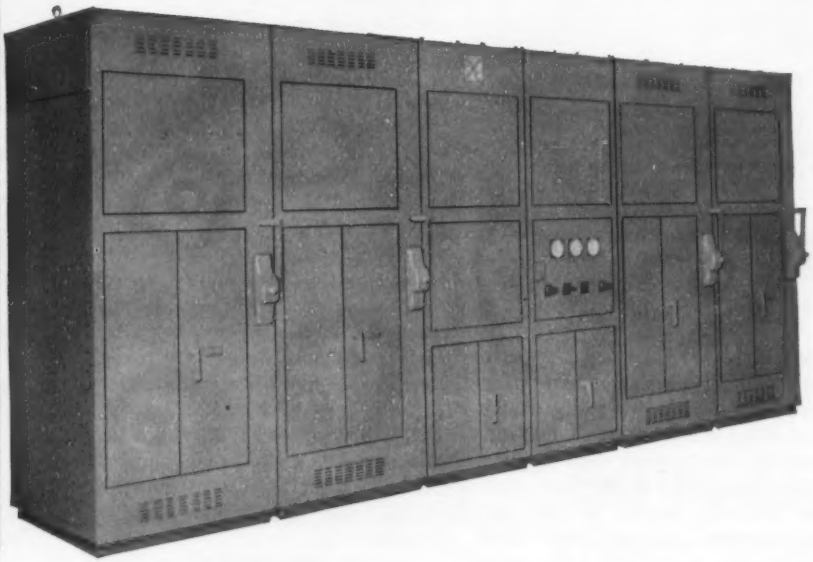


ACCELERATED AGEING TESTS for bolted aluminum to copper connections show the great importance of a tin buffer metal and proper application of oxide inhibitor to connection

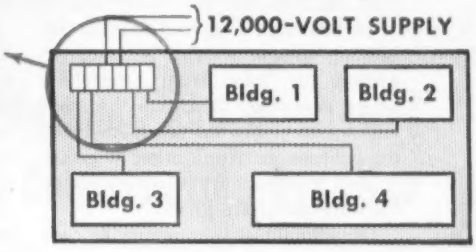
METALCLAD SWITCHGEAR PROVIDES

Low Cost Switching Centers

S&C has demonstrated time after time that expensive circuit breakers are usually unnecessary in switching centers. S&C Switchgear serves every needed purpose in high voltage industrial power distribution, at a cost usually about half that of circuit breakers.



In an aircraft plant, for instance, selection of S&C Metalclad Switchgear substantially reduced cost of the switching center. This 6-bay unit provides two separate metered sources of power, and protection for the outgoing feeders to the load centers in each of the buildings.



S&C BRINGS A NEW CONCEPT OF PROTECTION AND SERVICE

S&C equipment has been recognized by public utility engineers as "tops" for over 40 years. WHY? Because it permits greater flexibility in substation layouts—greater dependability in performance—greater convenience and safety of operation.

A new booklet on Metalclad Switchgear explains the fundamental concepts of S&C engineering, and how they affect the economics of industrial power distribution. Would you like a copy? Send the coupon.

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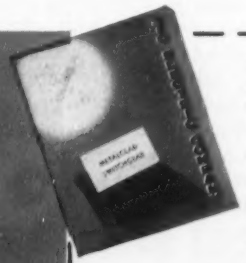

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Please send me your new booklet on S&C Metalclad Switchgear. No obligation on my part, of course.

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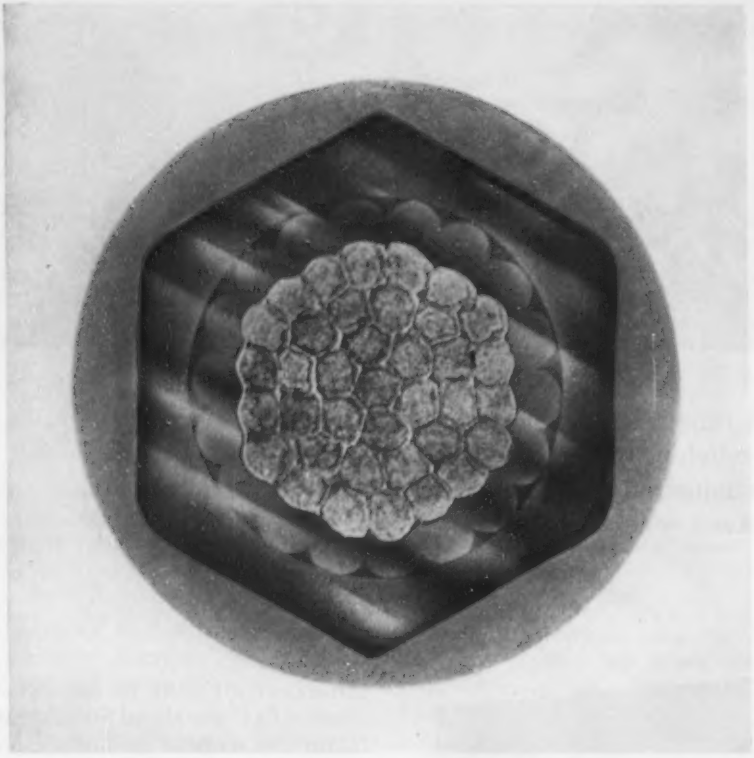


COMPRESSION FITTINGS are best because pressure is distributed evenly over a large area. Abrasive action when cable is being compressed rubs oxide from strands making good contacts

copper so that the copper salts will not drain onto the aluminum. Copper salts attack aluminum rapidly.

In addition, a good corrosion inhibiting grease should be used to protect the joint from electrolytic action and keep it airtight. Grease has no effect on the conductivity of the connection. Application of grease is also good practice when cables of the same metal are joined.

Occasionally it is necessary to connect aluminum terminals to copper bus bar. For normal usage standard finished aluminum terminals may be bolted directly to copper. Superior joints with low contact loss will be obtained if tin-plated aluminum terminals are used.

Comparative performance of bolted aluminum to copper joints under accelerated aging conditions are shown in an accompanying chart. The endurance test was designed to promote failure of connections so that a comparison could be made in a short time. Curves show that the tin-plated connectors with protective grease maintained the most satisfactory connection. Not far behind was the unplated, wire-brushed contact with corrosion inhibiting grease. These tests underscore the need for a clean contact with grease protection.

Utility Reports Experience . . . Similar test results for other aluminum fittings were substantiated by utility experience. One utility reported that tin-plated bronze clamps didn't last; a plated clamp failed in only four years. The company prefers to use aluminum-bodied clamps with large contact areas, particularly on its urban system where high load and heavy fault currents occur.

Laboratory tests indicate that soldered copper liners often intensify the corrosion problem. Under severe conditions, solder may corrode and expand, setting up stresses that split the connector body. Loose liners add moisture traps, thereby promoting rather than retarding electrolytic corrosion at the joint. Entrapment of solder fluxes may accelerate corrosion.

Salt air corrosion of aluminum conductor seems to be a greater problem on the West than on the East Coast. One possible explanation for this may be the prevailing winds. On the West Coast they blow from the ocean bringing corrosive salt air inland. Occasional winds from the ocean in the East are usually accompanied by rain which dilutes salt particles in the air and on fittings.

Best Type of Fitting . . . Compression fittings are the best type known for aluminum conductors. They compress the cable evenly around its circumference and have large contact surfaces. All cable strands carry equal pressure and current. Uneven distribution of pressure can damage soft metal strands and cause unequal current distribution.

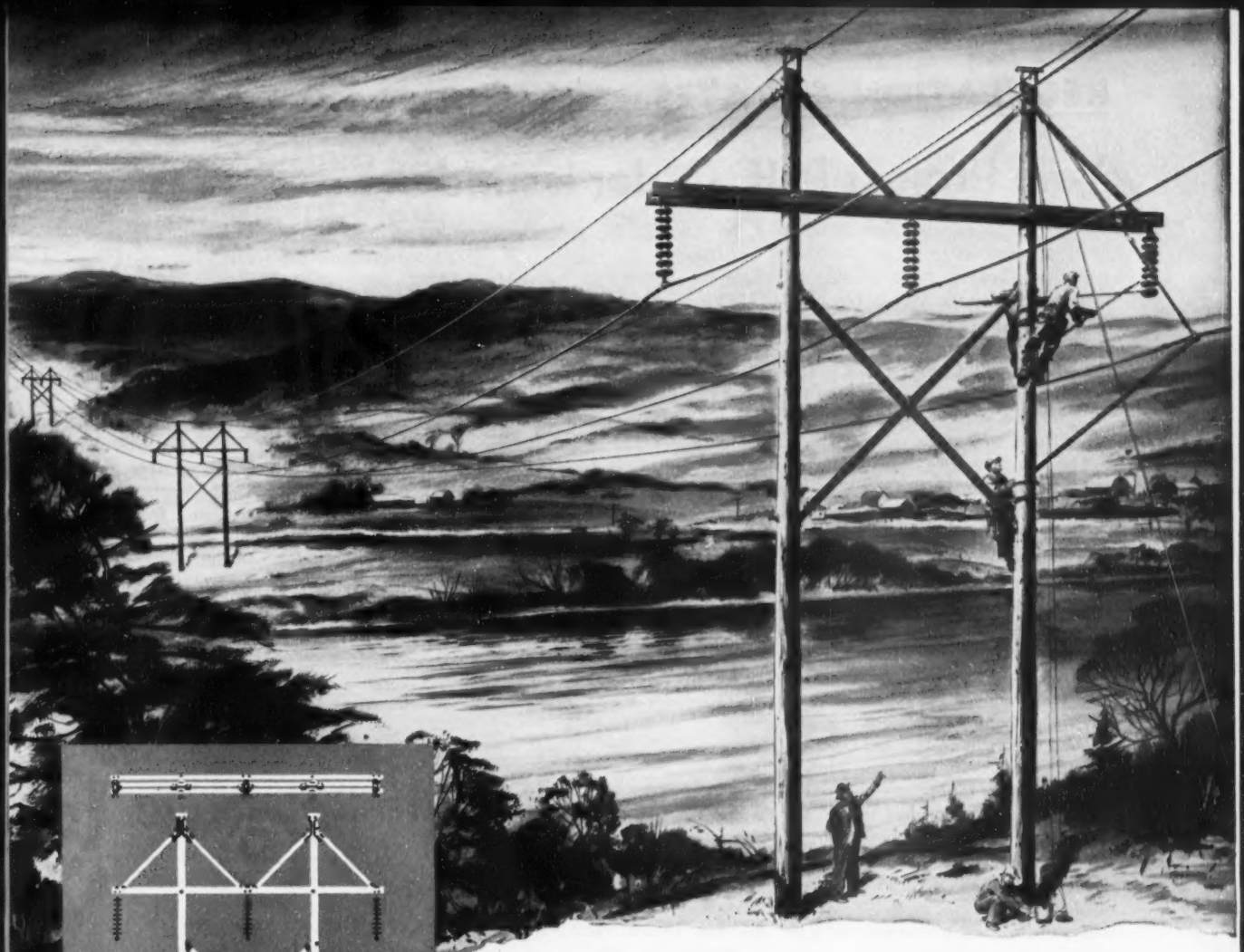
During compression of properly designed connectors, strands are rubbed against each other under enormous pressure. This abrasive action rubs the oxide film from strands and creates a good contact. Oxidation cannot reform because strands are pressed firmly together. There are virtually no air spaces between the cable strands or between cable and connector wall.

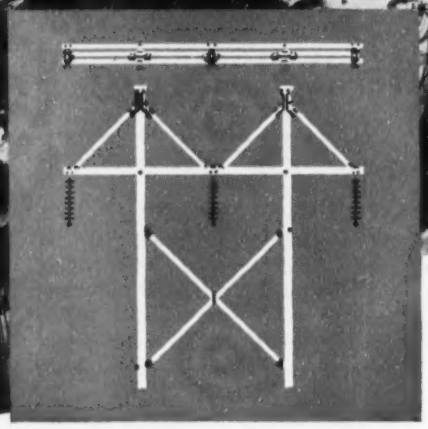
Properly designed bolted parallel groove fittings do a satisfactory job where a connection that must be opened is required. Large contact areas result in low unit pressures that prevent cold flow of cable and improves electrical properties.

Good Only for Solid Wire . . . One southern utility found that aluminum parallel groove connectors on small wires and service drops were preferable to both plated-bronze connectors and split-bolts with butterfly spacers. The company noticed that although split-bolts with copper-aluminum butterflies gave acceptable performance on solid wire, they did not do so on stranded wire.

Although aluminum isn't so strong mechanically as copper, proper design of conductors and fittings has made aluminum practical and greatly increased its use. Silicon-aluminum alloy is not so strong as copper-aluminum alloy but has sufficient strength to permit designers to take advantage of its corrosion resisting properties and higher conductivity.

Dependable service and performance of aluminum electrical conductor result when proper connecting devices are combined with good installing practices (See box). For some time this field will have a number of unsolved problems. But cooperation between users and manufacturers will solve the connector problem.





Type No. 702 —
Tangent Structure with braces . . .
for voltages 69 to 154 KV*

LIST OF MATERIAL

Quantity	Description
2	Crossarm
3	Steel spacer w/mounting bolts
2	Stud bolt ⅞" w/washer nuts and locknuts
1	Bent stud bolt ⅞" x 8" w/2 sq. nuts
2	Bent bolt ⅞" x 5½" w/sq. nut
4	Vee Brace 3⅜" x 4⅜" cross section
1 set	Cross brace w/fittings, clamp, ⅞" pole bolts, curved washers
2	Static wire support
4	Machine bolt ¾" w/locknuts
2	Clevis
2	Suspension clamp for static wire
as req'd	Suspension insulators & fittings

**This print was reproduced from the Graybar Bulletin GB-5078A on High Voltage Transmission Line Materials. This 92-page book covers, in condensed form, Graybar materials for line construction. Write us, if you do not already have your free copy.*

How Graybar Methods and Manpower help Standard Construction Practice

You can read in the open country of America the story of our rapid growth in production capacity. New transmission lines, reaching out over plains, mountains and rivers foretell our multiplying strength in building for defense and for better living.

Standard construction practice in transmission line building has given new facility to this basic work. And through its network of 109 offices and warehouses, Graybar contributes substantially to line building speed. Graybar's ability to deliver "packaged" crossarm assemblies for any line structure is a case in point. Fabricated and fitted with hardware to your specifications, the complete crossarm units can be delivered to the job at costs far less than those entailed in separate field handling. And, to complete the "package" Graybar Outside Construction Specialists are always on call to render technical help on out-of-the-ordinary problems. *Graybar Electric Company, Inc. Executive offices: Graybar Building, 420 Lexington Avenue, New York 17, N. Y.* 308-92

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Yale Project PUC Order Issued

An accounting and rate making order with respect to Pacific Power & Light Co's treatment of accelerated amortization for the Yale hydro project has been issued by the Oregon Public Utilities Commissioner. Under the terms of the Certificate of Necessity, Pacific is authorized to amortize 75% of the depreciable cost of the project over a five-year period.

The commissioner, in his order, said:

"Since the funds so provided **are supplied at no interest or dividend cost to Pacific, it is proper that the Commissioner shall, in the public interest, consider and give weight to the availability of such funds in future rate proceedings** [emphasis supplied]. This is to insure that the shareholders shall not benefit at the expense of the electric consumers as a result of the election of Pacific to exercise the Certificate of Necessity providing for accelerated amortization."

The order, with respect to the accounting treatment, bears a partial resemblance to the recent proposals of the staff of the Federal Power Commission in Docket No R-126 which was subsequently overruled by the commission by a 4 to 1 decision.

Net Income . . . The Oregon commissioner's order further stated:

"1 'Net Income' following 'Total Income Deductions' shall be entitled 'Net Income Before Provision for Federal Income Taxes Deferred.'

"2 A new account, '#539, Provision for Deferred Income Taxes Resulting from Accelerated Amortization,' shall be set up following 'Net Income Before Provision for Deferred Taxes' after which 'Net Income' shall be entitled 'Balance of Net Income After Provision for Federal Income Taxes Deferred.'

"3 On claiming accelerated amortization under Section 124A of the Internal Revenue Act of 1950, there shall be charged to said Account #539 each year an amount equal to the reduction in income taxes due to accelerated amortization. Concurrent credit shall be made to Account 271.1, 'Earned Surplus Restricted for Deferred Income Taxes Resulting from Accelerated Amortization.'

"4 After the period of accelerated amortization has terminated, credit said Account #539 monthly with 1/12 of 1/25 of the amount accumulated in Account #271.1 until such account is extinguished.

"5 Debits and credits to Account #271.1 shall be contra entries as indicated for debits and credits to Account #539.

"6 Property in respect of which said Certificates of Necessity are issued shall be accounted for in the same manner as other property and depreciation of such facilities shall be accrued at the normal rate.

"7 In no event shall the funds in Account #271.1 be used directly or indirectly for payment of dividends."

As to rate making the Oregon commissioner stated that:

"8 In any rate proceeding during any of the 25 years following the expiration of the 60-month period there shall be credited to operating revenue deductions for federal income taxes, 1/25 of the total amount by which its federal income taxes were reduced by such accelerated amortization."

Significantly, there is no mention in the commissioner's order of any charges "above the line" in lieu of taxes during the first five years when federal taxes are temporarily reduced because of the accelerated amortization provision.

It would appear then, from the foregoing, that in the first five years operating income would be temporarily inflated because of the deferral of federal income taxes and that only in the subsequent 25 years would operating income be normalized as more fully described in paragraph (8) shown above.

NKUD Asks Rate Rehearing

A petition for a rehearing has been filed with the Federal Power Commission by the Northern Kentucky Utilities District and the cities of Covington and Newport. It is in connection with a recent FPC order on accelerated amortization as it affects rates to the district and the cities. These petitioners are receiving service from the Union Light, Heat & Power Co, an affiliate of the Cincinnati Gas & Electric Co.

Rate Increase Request . . . The petition stated:

"There is presently pending before the Public Service Commission of Kentucky an application by Union for an increase in its rates charged your petitioners designed to pass on to your petitioners and its other customers the increased rates put into affect by its parent Cincinnati. It appears from the record in the Cincinnati rate case that the increased rates proposed therein are based on a cost of service which conforms to the policy enunciated by the commission in Opinion No. 264 in the treatment of the items of cost with which that opinion is concerned and it is alleged on information and belief that the increase in rates proposed by Cincinnati is therefore unjust and unreasonable in its entirety or in major part.

". . . Under section 205 (e) of the Act, the justness, reasonableness, and lawfulness of new rate schedules may be determined only after full hearings."

The petitioners claim that hearings on these issues have been denied them.

Service Cost . . . The petition went on to say:

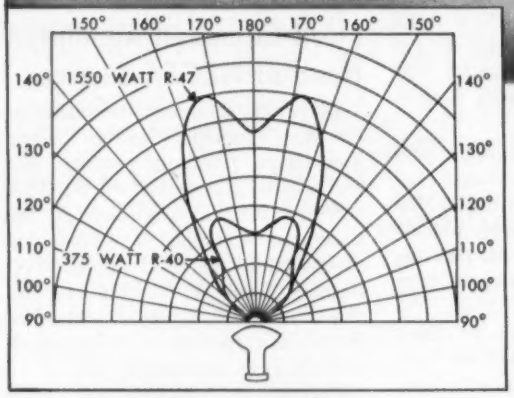
"The application of the principles enunciated in Opinion No. 264 will result in unreasonable and unjust rates in the pending Cincinnati rate proceedings and for the future. The cost of service derived from the application of the principles adopted by the commission includes fictitious elements of cost and is excessive. Under Opinion No. 264, the cost of service includes amounts for federal income tax in excess of actual liability for such taxes, and an amount of return based on an inflated rate base.

". . . If the excessive elements of the cost of service are eliminated there would be no justification for an increase in Cincinnati's rates, at least in the magnitude proposed."

Sylvania's Powerful New

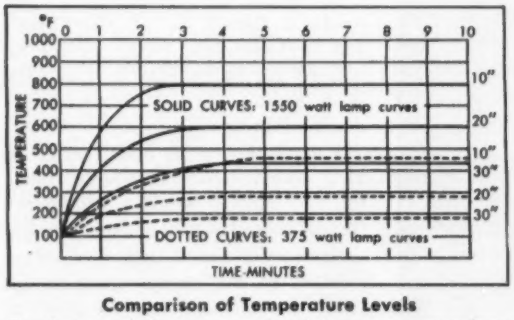
INFRARED LAMP

Opens New Fields in Heat Processing!



Comparison of Angular Radiation Distribution

The two curves show a comparison of energy concentration of Sylvania's 1550-watt lamp against a 375-watt lamp. Readings were taken on a 2-foot radius. Note greater radiation of 1550-watt lamp over larger area.



Comparison of Temperature Levels

The above graph shows a comparison between temperature levels reached with Sylvania 1550-watt lamps and 375-watt lamps on .035 inch thick cold rolled steel placed 10, 20, and 30 inches from a 3 x 3 lamp bank.

Delivers 3 times more radiation per square inch than conventional Infrared Lamps

PROVIDING a wattage density much higher than ever before available for infrared lamps (36 watts per square inch) Sylvania's powerful new lamp now opens up an entirely new field of applications plus new economies in infrared commercial drying, baking, and heating.

This improved lamp is equipped with 2 separate filaments and may be operated at three different wattages (650, 900, and 1550) thus permitting close control of infrared output.

Rugged and durable

Made of Vycor glass, the bulb is highly resistant to thermal shock and is unaffected by spattering liquids during operation.

Designed with a built-in gold reflector, which maintains 90 to 95% of its initial reflectivity, the lamp projects useful heat over an angle of approximately 120°.

For further technical information concerning the amazing performance and adaptability of this latest Sylvania achievement, write to: Sylvania Electric Products Inc., Dept. 4L-2803, 1740 Broadway, New York 19, N. Y.

SYLVANIA

LIGHTING • RADIO • ELECTRONICS • TELEVISION

In Canada: Sylvania Electric (Canada) Ltd.
University Tower Bldg., St. Catherine Street, Montreal, P. Q.

NEWS ABOUT PEOPLE

Titus Is Elected President . . .

. . . of Metropolitan Edison Co to succeed the late Wilbur H. Doran. He will continue as head of Pennsylvania Electric

O. TITUS

O. Titus, president of Pennsylvania Electric Co, Johnstown, Pa., has been assigned additional executive responsibilities with his election to the presidency of Metropolitan Edison Co with headquarters at Reading, Pa. Both companies are subsidiaries of General Public Utilities Corp.

As president of Metropolitan Edison, Titus succeeds Wilbur H. Doran who was killed in an automobile accident Jan. 6 (EW, Jan. 18, p 38). Doran succeeded Titus as MECO president in 1951.

Began as Cadet Engineer . . . Titus, an engineering graduate of Yale University, started his utility career as a cadet engineer with Rochester Gas & Electric Co in 1919. In 1930 he was appointed manager of the Lancaster district of New York State Electric & Gas Corp. Four years later he was elected a vice president in charge of the utility's Western Division and was appointed executive vice president in 1938. He continued in that capacity until 1941 when he went to Metropolitan Edison Co as president.

When Titus became president of Pennsylvania Electric in 1951, he relinquished to Doran the post of president of Metropolitan Edison.

While holding the MECO post Titus also served from 1941 to 1943 as president of New Jersey Power & Light Co, another General Public Utilities subsidiary. He also has been a member of the board of directors of MECO since 1941.

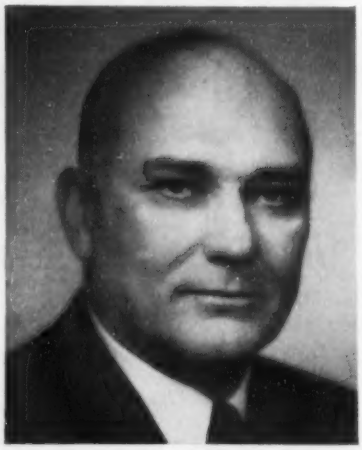
Maynard A. Laswell, vice president of C-O-Two Fire Equipment Co, has also been made vice president in charge of sales of Pyrene Manufacturing Co. Under Laswell, sales, advertising, and merchandising for all products of the affiliated companies, located in Newark, N. J., will become unified.

Robert A. Seidel, a vice president of Radio Corp of America since 1949, has been appointed vice president of RCA's Sales and Service Subsidiaries Division. In his new capacity, Seidel is responsible from his New York headquarters for the activities of RCA Institutes, Inc, RCA Service Co, Inc, and RCA Victor Distributing Corp.

George W. Ray, first employed as general foreman eight years ago, has been named manager of Central Missouri Electric Cooperative, Sedalia, Mo. He succeeds **Leland M. LaVelle,** deceased. Ray had previously been with Central Power & Light Co, Corpus Christi, Tex., which he joined in 1928. During his stay he progressed from ground man of a construction crew to manager of the utility's Balmorhea, Tex., branch.

Herman L. Schreiner, who has served Sylvania Electric Products, Inc, for the past year as a special sales representative in New York, has been named retail sales manager of the company's Lighting Division with headquarters in New York.

W. M. Trigg, former manager of materials pilot manufacturing department in Westinghouse Electric Corp's East Pittsburgh Divisions, has been made manager of the corporation's new metals development plant which will be built at Blairsville, Pa. Simultaneously Trigg named **Leonard W. Golden** and **R. D. Rowley** as top assistants. Golden, who joined Westinghouse in 1946, will be responsible for metals casting and manufacture of powdered metal parts and Rowley, with the firm since 1948, will be in charge of wrought alloy manufacture.



FLOYD D. CAMPBELL

Floyd Campbell Appointed Head of NEGEA Service

Floyd D. Campbell, president of the New England Gas & Electric Association, Cambridge, Mass., has been elected president of the NEGEA Service Corp, a subsidiary of the association. Campbell, who retains his responsibilities as head of NEGEA, succeeds Frank W. Randall, who has retired. Randall, however, will serve the service corporation as board chairman and as its consultant.

Campbell's association with NEGEA started back in 1938 when he became president and treasurer. Prior to this he was for several years president of Staten Island Edison Corp, which was merged with Consolidated Edison Co of New York, Inc, in December, 1952. Before he entered the utility field he was with W. S. Barstow & Co, New York Engineering firm.

Randall started his utility career in 1915 with the New Hampshire Electric Co, another NEGEA subsidiary. He was successively promoted through supervisory positions until he became assistant to the general manager in 1930. Seven years later he went to Cambridge as assistant to the vice president of NEGEA, becoming president of the corporation in 1940.

AIEE Nominates New Officers

Monteith, Westinghouse official, is nominee for president in 1954-55. Group designates five vp's and a treasurer

A. C. MONTEITH

A. C. Monteith, vice president in charge of engineering for Westinghouse Electric Corp, has been nominated 1954-55 president of the American Institute of Electrical Engineers.

The institute also announced the nomination of five vice presidents, a treasurer, and three directors.

Vice Presidents . . . Following vice presidents were nominated for two-year terms:

G. J. Crowes, chief engineer, Simplex Wire & Cable Co, Cambridge, Mass.; J. P. Neubauer, division engineer, Consolidated Edison Co of New York, Inc; Claude M. Summers, engineer, Works Laboratory, General Electric Co, Fort Wayne, Ind.; S. M. Sharp, vice president and chief engineer, Southwestern Gas & Electric Co, Shreveport, La.; and John R. Walker, regional power manager, U. S. B. R., Billings, Mont.

Walter J. Barrett, electrical coordinating engineer, New Jersey Bell Telephone Co, Newark, N. J., was renominated for a one-year term as institute treasurer.

Directors . . . These directors were nominated for four-year terms:

L. F. Hickernell, chief engineer, Anaconda Wire & Cable Co, Hastings-On-Hudson, N. Y.; Roy E. Kistler, transmission and protection engineer, Pacific Telephone & Telegraph Co, Seattle, Wash.; and Edwin S. Lammers, Jr, electronics engineering supervisor, Westinghouse, Atlanta, Ga.

Monteith's 25-year electrical engineering career began in 1923 at the Westinghouse East Pittsburgh works, where he was assigned from the student course to the central station engineering department in 1924. He was made manager of that department in 1938, and in 1941 was named manager of the industry engineering department. In 1945 he took over the dual posts of headquarters engineering department manager and director of education. Three years later he was elected vice president in charge of engineering and research.

AIEE's presidential nominee, a native of Ontario, Can., studied electrical engineering at Queens University at Kingston, Ont., where he received a B.S. degree in electrical engineering in 1923. Active in institute affairs since his student days, Monteith has served as chairman and as member of numerous AIEE committees and was a director from 1947 until 1951. He also has been chairman of the Pittsburgh Section of the institute.

OBITUARY

Francis J. Gannon

Francis J. Gannon, 67, president of Tampa (Fla.) Electric Co, died there last month.

Gannon's career in the utility field began in 1902 when he joined Stone & Webster, Boston. After two years with that organization, he was associated over a period of years with Dallas Power & Light Co, Pawtucket (R. I.) Electric Co, Edison Illuminating Co, Brockton, Mass., Sierra Pacific Power Co, Reno, Nevada, and North Texas Traction Co, Fort Worth.

FRANCIS J. GANNON

He was made president of El Paso (Tex.) Electric Co in 1928. Three years later he was named vice president and general manager of Tampa Electric, becoming its president in 1946.

Edward F. Callahan, 68, retired vice president of International General Electric Co, a division of General Electric Co, died Jan. 13 at Greenwich, Conn. Callahan, an electrical engineer, joined the GE foreign department in 1911, becoming a vice president of International in 1938. He retired in 1950.

Arthur Huntington, 79, retired mechanical engineer-economist of Iowa Electric Light & Power Co, died Jan. 3 at Cedar Rapids, Iowa. His utility career began in 1892 with Springfield (Ohio) Electric Light Co as a lineman's helper. He was affiliated with Westinghouse Electric & Manufacturing Co before becoming president of Sioux Falls (S. D.) Light & Power Co. In 1916 he joined Iowa Electric L&P as public relations engineer and economist. He served as a special assistant to the president of the Cedar Rapids utility before retiring in January, 1953. Huntington, who once was president of the American Society of Agricultural Engineers, had written reports on agricultural, engineering, and economic subjects.

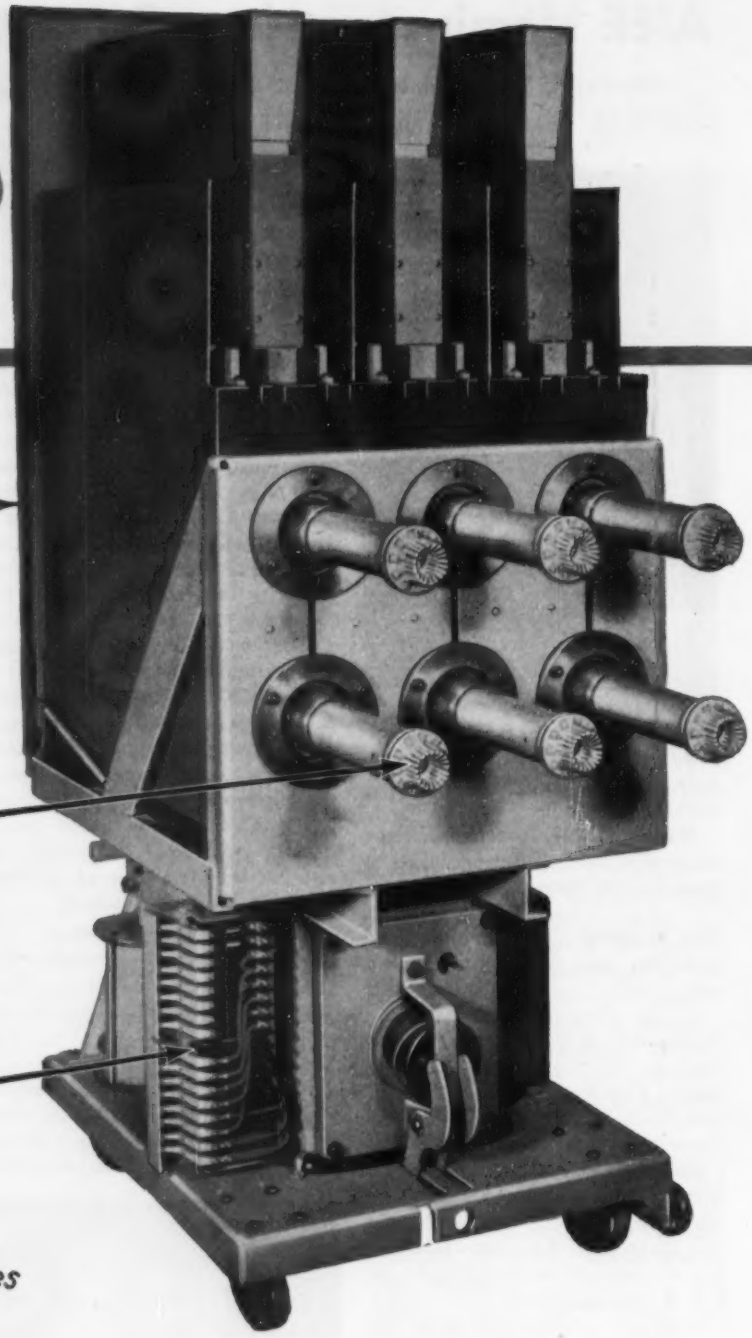
W. W. Ring, 48, assistant to the vice president in charge of consumer products for Westinghouse Electric Corp, died at Pittsburgh Jan. 20. A veteran of 18 years' service with Westinghouse, Ring assumed the assistant's post in 1949.

John L. Conover, 75, retired general commercial manager of Public Service Electric & Gas Co, Newark, N. J., died Jan. 15 at Shrewsbury, N. J. After serving with the company for 42 years, Conover retired in 1949.

John A. Howard, 61, superintendent of Consumers Power Co's plant at Muskegon, Mich., died Jan. 11.

ALLIS-CHALMERS

PROGRESS IN Switchgear



Safety first! Steel panel in front completely seals off high voltage members

Primary contact fingers are on bushing of movable portion ...easy, safe to inspect

Secondary disconnects are direct-connected to auxiliary switches- eliminating wiring

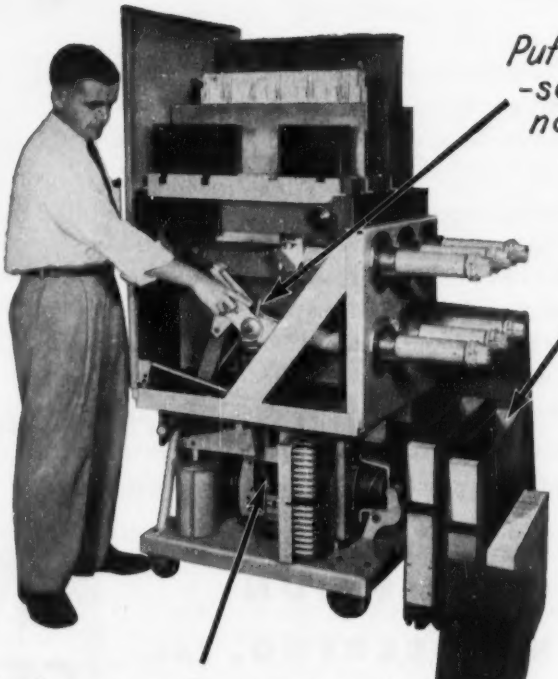
Shorter interrupting times for low currents

For additional information on this outstanding new breaker, call your nearby A-C district office or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4175

ALLIS-

engineering notes on

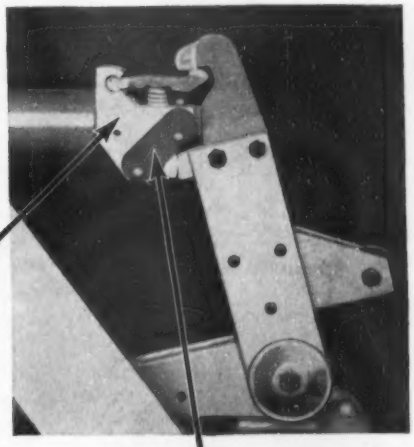
New 13.8-Kv Breaker



Puffer at ground potential -separately mounted- not on moving part

Each part of arc chute assembly is separately movable and can be conveniently handled by one man

Only 3 parts of operator plus armature move on closing operation; latch and trip-free link plus 3 parts of operator move during opening



Contacts are blow-on type. Magnetic field is arranged so that contact pressure increases as current increases

Access to contacts may be made by removing this insulated cover

CHALMERS

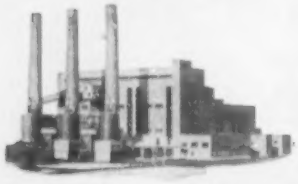
A-C ALLIS-CHALMERS

Central Hudson Gas & Electric Corp. — DANSKAMMER

Cincinnati Gas & Electric Co. — BECKJORD

Dayton Power & Light Co. — O. H. HUTCHINGS

Duke Power Co. — LEE



Metropolitan Edison Co. — TITUS

Niagara Mohawk Power Corp. — DUNKIRK

Public Service Electric & Gas Co. — SEWAREN

Rochester Gas & Electric Corp. — RUSSELL

10 OF THE TOP 15

The annual report of the Federal Power Commission entitled "Steam-Electric Plant Construction Cost and Annual Production Expenses," covering the year 1952, became available in December 1953.

Among other interesting and significant data therein were the "Average Btu per Kilowatt-hour Net Generation" rates for 331 power stations reporting from all sections of the country. Ten of the fifteen steam-electric stations having the *lowest* annual heat rates — as revealed by the report — are pictured here.

All the steam generating equipment in these ten stations was designed and built by Combustion Engineering.

B-723

COMBUSTION ENGINEERING, *Inc.*

200 Madison Avenue, New York 16, N. Y.

C·E

BOILERS, FUEL BURNING & RELATED EQUIPMENT; PULVERIZERS, AIR SEPARATORS & FLASH DRYING SYSTEMS; PRESSURE VESSELS; AUTOMATIC WATER HEATERS; SOIL PIPE

T.V.A. — JOHNSONVILLE

Wisconsin Electric Power Co. — PORT WASHINGTON

LAQUINTA PLANT, with the San Patricio reduction plant in background, is an integrated ore to aluminum operation, the first of its kind in Texas

Alumina for All to See

Reynolds plant, first in Texas, takes advantage of mild temperatures to put its equipment out-of-doors

Reynolds Reduction Co is keeping operations at its new LaQuinta alumina plant strictly out in the open. Taking advantage of mild south Texas climate, the wholly owned subsidiary of Reynolds Metals Co has put all its equipment out-of-doors at the plant located on the north shore of Corpus Christi Bay.

This is only one of the innovations at the 1,000-ton-a-day plant, according to J. Louis Reynolds, vice president in charge of operations. Another is that facilities are built in two 500-ton-a-day sections that can be operated independently or together, providing increased flexibility.

With the huge San Patricio reduction plant next door, this first alumina plant built in Texas gives the state a completely integrated bauxite to aluminum operation.

Ocean Connection . . . LaQuinta, which employs about 550 people, is designed especially to process Jamaica bauxite. Oceangoing vessels bring the bauxite up a 6½-mile, 32-ft deep channel, across the bay to a new pier constructed on the waterfront side of the 1,700-acre site. Here the ore is unloaded by belt conveyors and stored prior to processing.

Steam is generated in boilers at a pressure of 850 psi. Power is produced by sending the steam through generators, after which the exhaust steam is used for processing.

Fuel for boilers and calcining kilns is natural gas with plant requirements totaling about 20 million cubic feet daily.

Fresh water needs total about 2½ million gal each day, drawn from facilities of nearby Corpus Christi through a 28-mile pipeline, 24 in. in diameter.

Machine shop, laboratory, and other service facilities essential to the operation of the plant are supplemented by industrial installations in and around Corpus Christi.

Swiss Subsidiary in U. S. Center of Contract Issue

Decision on whether a U. S. subsidiary of a Swiss firm should be entitled to the 5% preference allowed Washington state firms will determine the low bidder on a circuit breaker contract at Seattle.

General Electric Co is apparent low bidder at $237,300 but the third low $244,000 bid of Pacific Oerlikon Co, Tacoma, would be favored if its claim for the preference is allowed.

The city charter provides that 5% be added to bids of out-of-state firms in similar situations, for purpose of choosing the low bidder. The contract involves 20 circuit breakers of 34.5-kv rating.

The proposals of neither General Electric nor Westinghouse, second low at $237,370, contained the escalator clauses which have become standard in recent years.

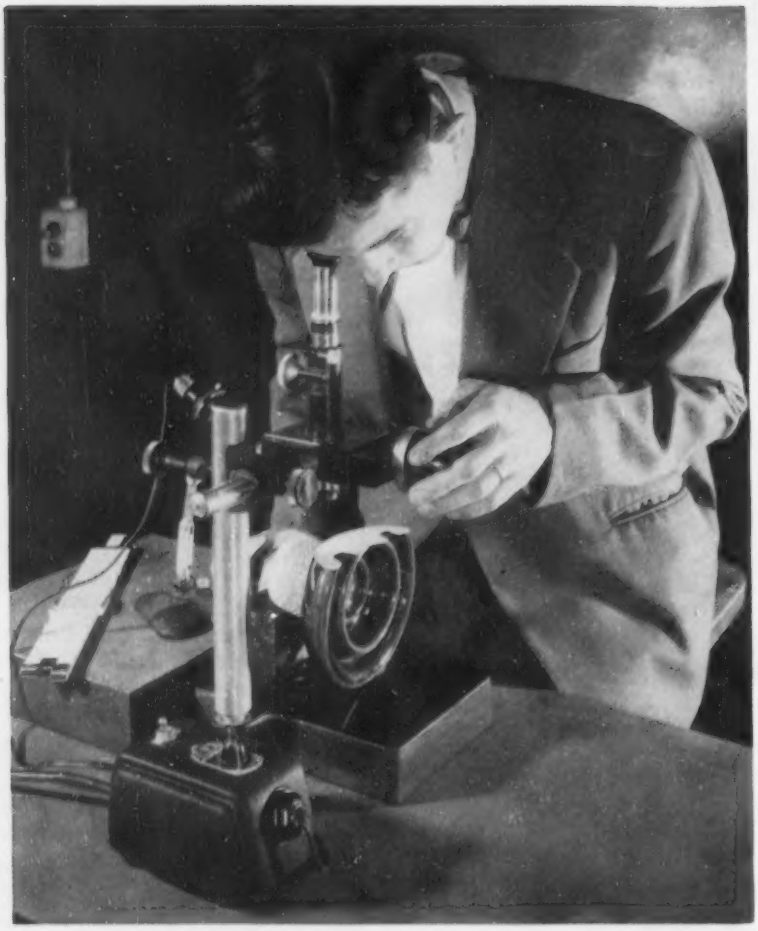
Three other bids ranged up to $288,-353.

MANUFACTURING BRIEFS

Aluminum Association announced that primary aluminum production by domestic companies dropped to 211,-273,802 lb in November from 216,-438,214 lb in the preceding month. Production for November a year previous was 149,277,906 lb. For the first 11 months of this year output amounted to 2,283,446,289 lb, against 1,707,825,505 in the like period of 1952.

Twelve electrical manufacturing firms have been certified as "excellently managed" by the American Institute of Management. They are: Electric Storage Battery Co, Philadelphia, Elliott Co, Jeannette, Pa, General Electric Co, McGraw Electric Co, Elgin Ill, Square D Co, Detroit, Sylvania Electric Products, Inc, Sprague Electric Co, North Adams, Mass, Borg-Warner Corp, Electric Auto-Lite Co, and General Motors, Chrysler and Carrier Corps.

H. M. Harper Co has moved its New York City operation to a newly constructed, 15,000-sq ft building at Mamaroneck, N. Y.



Locke Offers Microglaze Insulators

New development of Microglaze suspension insulator has been announced by J. W. Seaman, general manager of General Electric Co's Locke Department at Baltimore, Md.

To explain Microglaze Insulators, Locke Engineering Manager Howard Frey said glaze thickness is held to an optimum value where resistance to mechanical impact is greatest. He added that these insulators can be produced with assured uniform peak strength, and color and smooth appearance. A ceramic engineer is shown measuring glaze thickness of a new Locke Microglaze suspension insulator in laboratory at Baltimore.

SALES ASSIGNMENT

COMPANY STAFFS

Dravo Corp's Machinery Division has announced that District Manager Walter R. Hoffman will manage the Cleveland office at its new location at 4207 Chester Ave., Cleveland 3.

Babcock & Wilcox Co's Tubular Products Division has made E. T. Wilson, Jr its sales representative for Oregon, Washington, and British Columbia, Alberta, and Saskatchewan, Can. Wilson, formerly purchasing agent for Cascade Manufacturing Co, will direct the sale of the division's products from his headquarters at 1432 S.W. Sixth Ave., Portland, Ore.

National Electric Products Corp has named Robert O. Burke district sales manager of its Washington, D. C. office.

Graybar Electric Co has appointed August Stang, Jr manager of its Allentown, Pa., Branch.

BullDog Electric Products Co has appointed Gordon P. Bowman district manager of the Cincinnati sales office.

REPRESENTATIVES

Day-Brite Lighting Fixtures has appointed Edward L. Peterson representative for the San Diego and southeastern California territory.

MEETINGS CALENDAR

California Municipal Utilities Association
1954 Annual Conference, Mission Inn, Riverside, Calif., Feb. 2-5.

Edison Electric Institute
Joint Meeting of EEI Meter-Service Committee and Association of Edison Illuminating Companies Metering and Service Methods Committee, Adolphus Hotel, Dallas, Tex., Feb. 3-5; Commercial Lighting Committee, Washington, D. C., Feb. 4-5; Transmission and Distribution Committee, Hotel Cleveland, Cleveland, Ohio, Feb. 9-10; Electrical Equipment Committee, Sheraton Cadillac Hotel, Detroit, Mich., Feb. 15-16; Commercial Space Heating and Air Conditioning Committee, Tutwiler Hotel, Birmingham, Ala., Feb. 18-19; Industrial Relations Committee, EEI Headquarters, New York, March 18; 20th Annual Sales Conference, Edgewater Beach Hotel, Chicago, April 5-8; EEI-AGA Accounting Conference, Hotel Statler, Boston, April 12-14; Industrial Relations Committee, Netherlands Plaza Hotel, Cincinnati, Ohio, April 15; Annual Convention, Atlantic City, N. J., June 1-4.

Pennsylvania Electric Association
Communications Committee, Henry Hudson Hotel, New York, Feb. 4-5; Hydraulic Power Committee, Fort Stanwix Hotel, Johnstown, Pa., Feb. 4-5; System Planning Committee, Hotel Sheraton, Pittsburgh, Pa., Feb. 8-9; Transmission-Distribution Committee, Lord Baltimore Hotel, Baltimore, Feb. 11-12; Prime Movers Committee, Hotel Robert Treat, Newark, N. J., Feb. 15-16; Systems Operation Committee, Fort Stanwix Hotel, Johnstown, Pa., Feb. 18-19; Electrical Equipment Committee, Hotel Roosevelt, Pittsburgh, Feb. 25-26; Relay Committee, Benjamin Franklin Hotel, Philadelphia, March 4-5.

Public Information Program
West North Central Region Meeting, Edgewater Hotel, Madison, Wis., Feb. 5; Inter-Regional Committee, Blackstone Hotel, Chicago, Feb. 17; East North Central Region, Cleveland, Ohio, Feb. 25.

Electrical Equipment Representatives Association
Winter 1954 Meeting, Biltmore Hotel, Los Angeles, Feb. 8-11.

National Association of Purchasing Agents
Mid-Winter Conference, Public Utility Buyers' Group, Lord Baltimore Hotel, Baltimore, Md., Feb. 15-16.

Canadian Electrical Association
Western Zone Meeting, Royal Alexandria Hotel, Winnipeg, Man., March 1-3; Annual Convention, Murray Bay, Quebec, Can., June 24-26.

National Electrical Manufacturers Association
Spring Meeting, Edgewater Beach Hotel, Chicago, March 8-11.

Southeastern Electric Exchange
21st Annual Meeting, Boca Raton Hotel, Boca Raton, Fla., March 22-24; Spring Meeting, Engineering and Operation Section, Sans Souci Hotel, Miami Beach, Fla., May 6-7.

American Power Conference
Sherman Hotel, Chicago, March 24-26.

Oklahoma Utilities Association
Annual Convention, Biltmore Hotel, Oklahoma City, March 25-26.

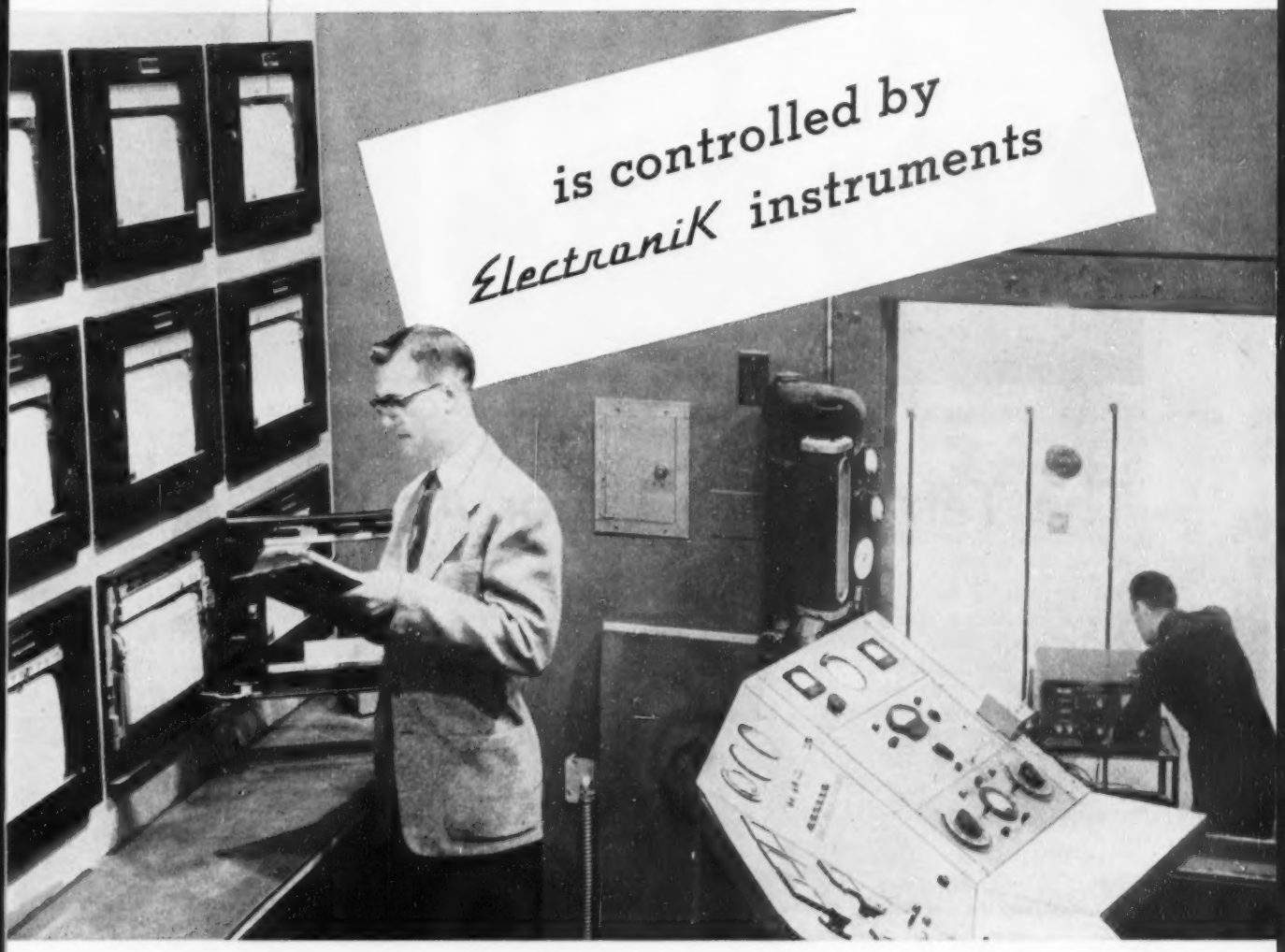
Pacific Coast Electrical Association
Administration Services Section, Hotel Claremont, Berkeley, Calif., April 7-8; Annual Convention, Hotel Del Coronado, Coronado, Calif., May 19-21.

American Institute of Electrical Engineers
Conference on Feedback Control, Claridge Hotel, Atlantic City, N. J., April 22-23; Northeastern District Meeting, Schenectady, N. Y., May 5-7; Conference on Telemetering, Morrison Hotel, Chicago, May 24-26; Summer General and Pacific General Meeting, Hotel Biltmore, Los Angeles, June 21-25.

***American Public Power Association**
Annual Meeting, Hotel Morrison, Chicago, May 4-6.

*Addition this week.

First "civilian" atomic reactor



Instrument control panel for new low-power nuclear reactor at North Carolina State College.

RESEARCH into the utilization of atomic energy took a significant forward stride with the completion of North Carolina State College's new low-power nuclear reactor. For this marked the birth of the first privately-owned reactor, and the first intended solely for investigation of non-military uses of the atom.

Although small by Oak Ridge standards, this reactor requires top quality instrumentation. And here as in many big government-operated installations, *ElectroniK* instruments are the choice. Their precision, sensitivity and dependability provide the performance essential to monitoring and controlling the complex, inter-related variables of reactor operation.

To power engineers investigating the practical utilization of nuclear energy, Honeywell offers a wide line of instruments applicable to laboratory research and full-scale reactor operation . . . and extensive field experience in engineering complete instrumentation for the varied phases of atomic power.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls

Principal speakers at Industrial Relations Conference in New Orleans discuss . . .

'The Taft-Hartley Labor Act'

The Taft-Hartley Act is a "sound law" as it embodies a "sound principle." This was a statement made by Guy Farmer, chairman, National Labor Relations Board, before the Joint Conference of the Industrial Relations Committees of the Edison Electric Institute, Southeastern Electric Exchange, and Southwestern Personnel Group in New Orleans recently.

"This is the statute which we administer," he said, and "I would not have undertaken the job if I did not believe that it is basically a sound law."

Less to do for NLRB . . . He pointed out that the NLRB would have a great deal less to do if employers and unions alike would only start out by truly accepting the principles and practices of collective bargaining. Thus, he said, "the area of potential labor-management strife would be substantially narrowed."

Purcell L. Smith, president of the National Association of Electric Companies, gave a forecast of what he thought might happen to labor-management legislation in the present Congress:

They are:

1 Thinks the two committees of Congress will probably vote out a bill containing some, but not all, of President Eisenhower's recommendations.

2. Doubts that the "strike vote" recommendation will be included in either bill.

3 Feels that the bill will not get to the floor of either the House or the Senate. If it should, the chances are there will be either no revisions in the Taft-Hartley Act or a few minor, noncontroversial ones, adopted.

"My bet would be no amendments," he concluded, "unless there is a serious national strike which would inflame emotions."

The conference next heard Ed Burris, executive manager of the Texas Manufacturers Association, who said that business must become active in "politics" or it will be "regulated" out of business. To do this job, he suggested that businessmen read the pamphlets put out by the Texas Manufacturers Association entitled, "How to Be Influential in Politics."

Get Legal Advice . . . In a talk entitled "Bugs in Contracts—How to Avoid Them, and Why We Should Resist Them," R. C. Simpson of Gilbert Associates recommended that the industrial relations department of the company should turn over to legal counsel the contract changes in order to review phraseology "before you commit yourself, irrevocably to it."

To get "An Honest Day's Work," Edmund J. Thimme, industrial relations manager of the Public Service Electric & Gas Co, said that "good relations and high production" are inseparable. You can't have one without the the other. This tie-in is based on the personal approach. It is convincing the employee that management is really interested in him as an individual, he said. When the employee is sure of that—he'll listen to us—believe us—he'll follow our leadership, and he'll work for us.

Other speakers were:

K. K. Allen, personnel director, Southern California Edison Co; Dr Wesley Wiksell, consultant in Industrial Relations, Louisiana State University, Baton Rouge, La.; Shirley Gracy, vice president, Florida Power Corp; and Howard Mold, Minneapolis-Honeywell Regulator Co.

The Pictures . . .

Speakers shown above are left to right: E. A. Werner, Gulf States Utilities, chairman of the meeting. G. C. Rawls, Louisiana Power & Light, welcomes Ed C. Burris, Texas Manufacturers Association, and P. L. Smith, National Association of Electric Companies. Government leader (far right) is Guy Farmer, chairman of NLRB.

FINANCIAL

Ike's Tax Plan to Help Industry

President's proposals aimed at easing utilities' amortization programs to aid expansion. Stockholders get benefits

There's bitter and there's sweet in the Administration's tax program now being worked on by the Treasury Department and the House Ways and Means Committee. What President Eisenhower laid out in his tax proposals to Congress recently is mainly designed to give business a freer choice but still to make the rules of the road apply to everyone and anyone.

- Utility companies will get a better break on amortizing their new plant and equipment.
- Stockholders will get some benefits from proposed changes in the corporate profits tax provisions.
- But all business will be asked to estimate their current year profits and make payments toward their liability in the year they are earned.

The Treasury Department and the Tax-Writing Ways and Means Committee have dovetailed their tax revision ideas almost to a "T" and so most of what Eisenhower's budget message proposed will come up for a vote in Congress.

Aim of Tax Changes . . . The central purpose of some 23 specific tax changes is to provide more head room for expanding industries. The Administration is pinning its plans for continued prosperity to these changes.

Heading the list of Eisenhower suggestions is quicker write-off of new plant and equipment for tax purposes. Under existing rules, property is usually depreciated in equal annual installments over its useful life. The Administration favors rules which would allow two-thirds of the cost to be written-off in half the property's use life. The new rules, if adopted, would apply to anything built or purchased after Jan. 1 of this year.

Teaming up with this suggestion is a recommendation that the present one-year loss carry-back provision be extended to two years. The idea is to reduce the dollar burden companies risk in the early years of an expansion program. The present five year carry-forward for losses would be retained.

Some companies would get still another break. Eisenhower recommended that the Section 102 rule regarding accumulation of earnings be liberalized. His advisors believe investment would be encouraged if the government had to prove that earnings were being held back to an unreasonable degree, before Section 102's penalty tax could be levied. In the past, the Treasury Department rulings have forced many small companies to pay out more in dividends than they wanted to, thus crippling expansion program.

Exempt Dividends from Taxes . . . Taxation of dividends got a friendly nod in the tax revision plan. Eisenhower spelled out this suggestion: Exempt the first $100 of dividends from the personal income tax. (This year he would have the benefit take effect on Aug. 1, so the exemption would be only $50 on 1954 income.) Additionally, he would give taxpayers a 5% credit on their taxable dividend income, to be subtracted from their final tax bill.

A bundle of other tax requests were made in the message:

Simplify the rules about reorganization of corporations, so tax consequences will be made plain.

Change tax accounting rules to allow prepaid income to be taxed when earned, not when received as at present, to allow reserves to be established for known expenses coming in the future.

Offers Advance Tax Plan . . . Eisenhower made one suggestion that would add to a corporation's tax worries. He suggested that corporations start estimating their profits currently, and make advance payments on taxes which under present laws, would be due the following calendar year. Here is how it would work: By 1955, a corporation's entire tax liability for one calendar year would be due in equal installments in March and June of the next year. This is the Mills Plan.

Eisenhower wants corporations to make additional payments in 1955, one in September and one in December. The payments would be 5% of estimated taxes on 1955 profits—payable, under this plan, before the year is over. These payments would step up gradually from 5 to 25%. This means a partial pay-as-you-go system for corporations.

Alcoa Holds U. S. Lacks Authority Over Its Plants

Aluminum Company of America again last week argued that three of its hydro plants in North Carolina and Tennessee are not subject to federal jurisdiction.

The three projects are operated by Alcoa subsidiaries and integrated in the Tennessee Valley Authority system. Knoxville Power Co operates the Calderwood plant which has an installed capacity of 121,500 kw. Carolina Aluminum Co operates the Cheoah 106,000 kw plant and the Santeetlah 45,000 kw plant. All are on the little Tennessee River and its tributaries.

Fight over Federal Power Commission jurisdiction dates back to 1941 and several previous actions have been taken by FPC. The oral argument last week on the issue was before the five-man FPC.

Main contentions of Alcoa are:

1. Sites at which the plants are located are not navigable streams, nor do they affect the navigable capacity of downstream channels.

2. Under Section 26 of the TVA act, the plants are exempted from FPC jurisdiction.

The FPC staff sought to refute each of these contentions. As to exemption under the TVA act, the staff admitted that the three plants are coordinated by TVA operations, but argued they are not operated by TVA. Hence, said the staff, they are subject to FPC licensing.

If Alcoa should lose, it would be required to obtain FPC licenses for the three projects and satisfy FPC requirements under those licenses. Such requirements include adoption of a uniform system of accounting and submission of operating reports.

Oregon Fuel Group Attacks Electric Rate Reduction

A downward revision of electric rates for domestic customers by Eugene (Ore.) Water & Electric Board was blasted unexpectedly at a public meeting as being unfair to customers who don't heat their homes electrically. The reduction, which would lower the last step from 1.6¢ per kwhr to 1¢ regardless of consumption, is being opposed by a group representing Eugene fuel dealers and sheet metal workers.

Basis for the decrease is a recent study that indicates electric house heating customers have a better load factor than other domestic customers. At present, customers with electric heating pay 1.6¢ per kwhr for all consumption above about 1,200 kwhr per month. All other domestic customers are on a rate with a 1¢ last step.

The report, made by Prof Harold Cockerline of Oregon State College, Corvallis, points out that electric heating customers, therefore, are unduly penalized by the 1.6¢ "balloon" rate.

Opponents of the rate reduction claim that the new rate will not be a fair distribution of the cost of service among all domestic customers of the municipal utility. Furthermore, they maintain oil heating would still be cheaper than electricity for most homes.

In view of this unexpected opposition, the EWEB will hold another public meeting to explain the new rate and to allow the opposition to present its charges.

Challenges Method Used to Pick PUC Commissioner

The question of whether Oregon's Public Utilities Commissioner should be an elected official may be on the next general election ballot in that state. A preliminary petition for an initiative question was filed Jan. 6 with the Oregon election bureau by State Rep Monroe Sweetland, Milwaukee Democrat, who was a principal complainant of the disputed surcharges on three Oregon utility company customer billings which PUC subsequently upheld.

Oregon's commissioner is now appointed by the governor.

Today in Utility Finance

YIELDS (%)

Quality	Bonds 1st	Bonds 2nd	Bonds 3rd	Preferred Stocks 1st	Preferred Stocks 2nd	Preferred Stocks 3rd	Common Stocks 1st	Common Stocks 2nd	Common Stocks 3rd
DATE									
1954									
Jan. 21	**2.97**	**3.02**	**3.21**	**4.08**	**4.15**	**4.55**	**4.96**	**5.42**	**5.43**
Jan. 14	3.01	3.05	3.26	4.10	4.17	4.57	5.03	5.48	5.50
END OF QTR.									
4th 1953	3.07	3.12	3.34	4.17	4.32	4.62	5.07	5.57	5.51
3rd 1953	3.30	3.33	3.54	4.35	4.52	4.83	5.36	5.97	6.01
2nd 1953	3.34	3.46	3.64	4.47	4.70	4.88	5.52	5.93	6.10
1st 1953	3.15	3.23	3.39	4.16	4.41	4.66	4.95	5.24	5.50

Data: Reis & Chandler, Inc.

EARNINGS

Company	Period Months Ended		Net Income 1953	Net Income 1952	Earnings Per Common Share 1953	Earnings Per Common Share 1952
Central Maine Power	11	Nov.	$3,997,833	$4,267,158	$1.37(a)	.....
San Diego Gas & Electric	12	Nov.	4,576,452	4,449,557	.....	.....

Note—(a) Based on shares now outstanding.

FINANCING

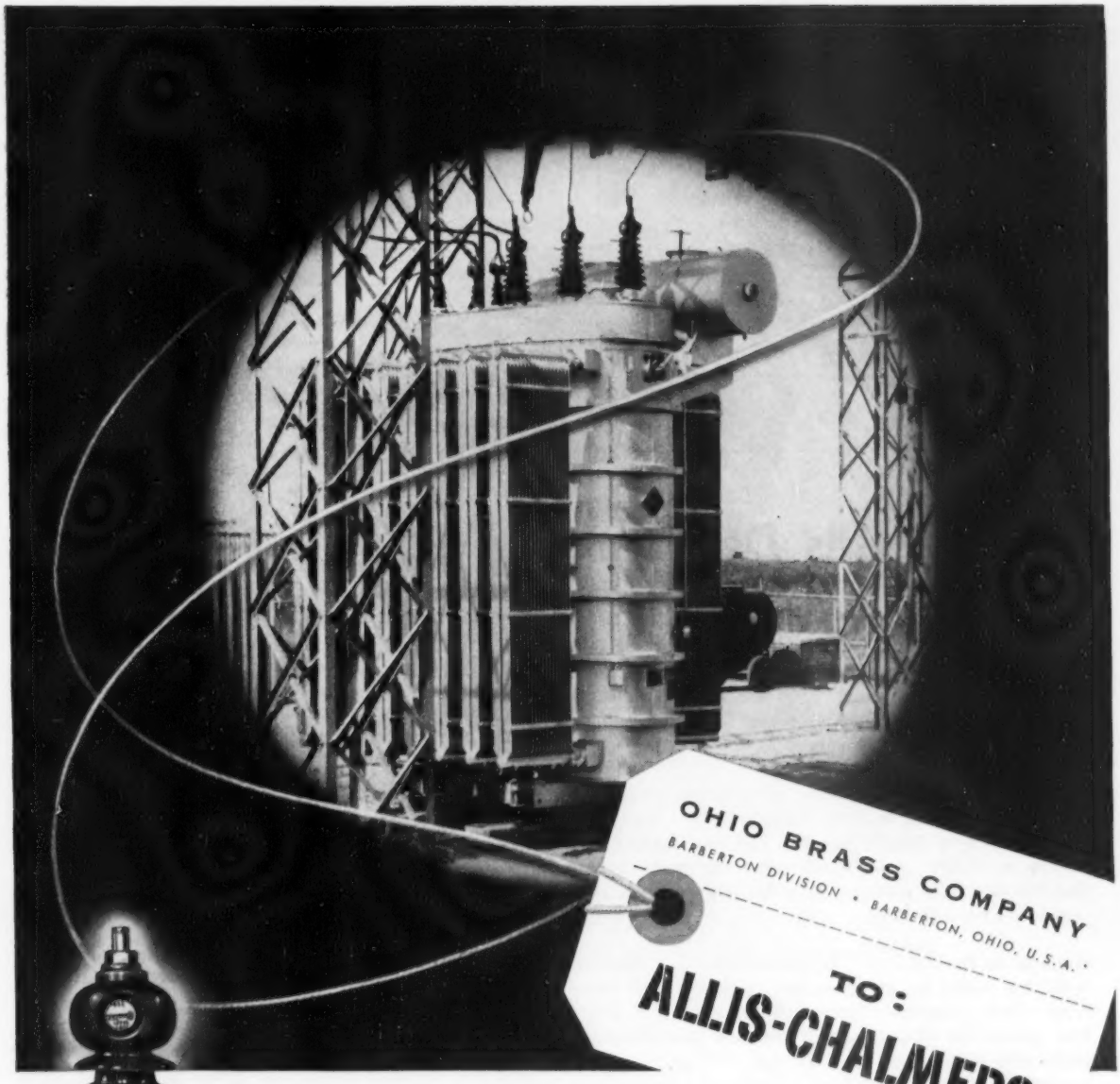
Company and Description	Amount of Offering (000)	Offering Price	Yield to Public
WEEK OF JANUARY 21-27			
Bonds			
Glendale, Calif.—electric revenues 2% due 1955-74	$1,000	various	1-2.25%
Commonwealth Edison—Gas Divisional bonds 3¼% due 1979	60,000	102%	3.34
Debentures			
Otter Tail Power—convertible debs 4¼% due 1964 (being offered commonholders on the basis of $4 principal amount of debs for every one share of common, record Jan. 22 to expire Feb. 8)	$2,500	$100.00	4.25%
SCHEDULE FOR FEBRUARY—MARCH—APRIL—MAY			
Bonds			**Bid Date**
Public Service Co of Oklahoma—1st mtg due 1984	$12,500	.....	Feb. 8
Louisville Gas & Electric—1st mtg	12,000	.....	Feb. 9
Pacific Gas & Electric—1st mtg due 1984	60,000	.....	Feb. 16
Essex County Electric—1st mtg due 1984	5,000	.....	Feb. 17
Houston Lighting & Power—1st mtg due 1989	30,000	.....	Mar. 1
Surburban Electric—1st mtg due 1984	4,000	.....	Mar. 3
Alabama Power—1st mtg due 1984	17,000	.....	Mar. 16
Georgia Power—1st mtg due 1984	11,000	.....	April 6
Community Public Service—1st mtg due 1944	3,000	.....	.....
Utah Power & Light—1st mtg due 1984	15,000	.....	May 19
Preferred Stock			
Mississippi Power & Light—60, .00 sh $100 par	$6,000	.....	Feb. 2
Common Stock			
Utah Power & Light—about 200,000 sh	$.....	.....	Mar. 23
Black Hills Power & Light	300(e)	.....	.....
Southwestern Public Service—272,500 sh (to be offered commonholders on a 1-for-14 basis, record Feb. 1 to expire Feb. 16 with an oversubscription privilege)	.....	.....	.....
Missouri Public Service—527,865 sh (to be offered commonholders on a sh-for-sh basis, record about Feb. 4)	.....	.....	.....

Notes—(e) Estimated.

Sweetland's filing was found in error in a minor item and must be refiled in a few days. The Democratic National Committeeman then will have to obtain 37,404 signatures on petitions in order to obtain ballot position.

FINANCIAL BRIEFS

San Diego Gas & Electric Co is planning to sell competitively $17 million first mortgage bonds on March 30 . . . **Southern California Edison Co** has asked California Public Utilities Commission to be exempt from competitive bidding on a contemplated issue of 600,000 shares of common stock . . . **Colorado Central Power Co** will pay three monthly common stock dividends of 10¢ a share each payable Feb. 1, March 1, and April 1 to stock of record Jan. 20, Feb. 15, and March 15, respectively. A payment of 28¢ a share was made in each quarter of 1953 . . . Public Service Co of New Mexico directors have declared a common stock dividend of 17¢ a share as compared with 14¢ in previous quarter.



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Serving an important metropolitan load in the Southwest, this Allis-Chalmers power transformer has the following characteristics, according to its manufacturer: "OISC, primary 60 kv, secondary 12.47 kv, 15,000 kva, 3-phase, 60-cycle, 55-degree C rise. Equipped with 'Oil-Sealed' inert gas preservation system, as pioneered by A-C and now standard on over five million kva of power transformers. Among other factors contributing to highest reliability are . . ."

BUSHINGS

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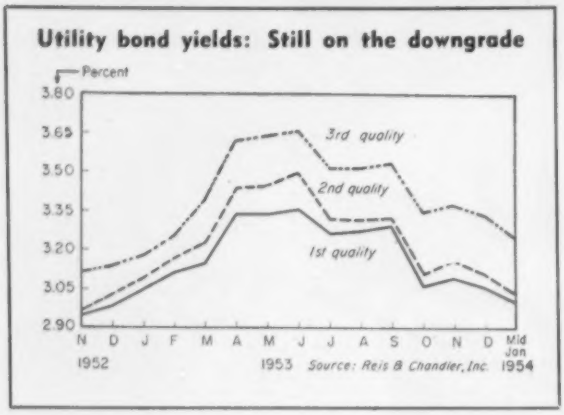
ELECTRICAL BUSINESS OUTLOOK



Bond Yields Declining Along With Business

Utility bond yields have now come full circle under the Republican Administration. They are about back where they were when President Eisenhower took office, after a year of strong ups and downs.

But there was a key difference between the situation in January, 1954, and that of January, 1953. Last year, bond yields were headed upward. This year opened on a decline in yields. And there's good reason to believe that the dominant pressure on yields will be moderately downward for some time.

Business in Decline . . . The current decline in business is the key reason for expecting bond yields to head downward. Most economists think that the decline in industrial production (now about 8% below last summer's peak) will continue at least through midyear. Here's a rundown of the chief arguments for somewhat lower yields in 1954.

1. Total private demand for borrowed money will be lower in 1954, barring a sharp improvement in the business picture.

Private borrowing would probably be lighter this year, even if business were not declining. One reason is that corporations will have more money to meet their obligations without asking for loans—because of the demise of the excess profits tax. Profits before taxes are still quite high, although they are expected to decline later in the year. In addition, corporations will have substantially larger charges for depreciation than ever before. Corporate depreciation charges were about $13 billion last year, and may pass $15 billion in 1954. With capital spending apparently due to level off (EBO, Nov. 9), that means less need to finance new investments with borrowed money.

The drop in business activity reduces cash needs further, by removing the necessity to borrow heavily to finance inventories. Inventories grew sharply last year, but they are being cut sharply now. The result may be net repayments of inventory loans. Consumers will also be borrowing less, if present indications are borne out. Housing starts, automobile sales and sales of other consumer durables all are expected to run lower than last year. Housing and durable goods provide the chief motives for consumer borrowing.

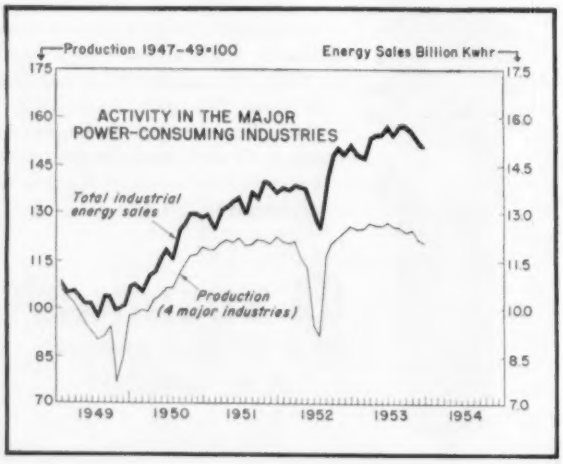
2. The supply of money for borrowers will still be high.

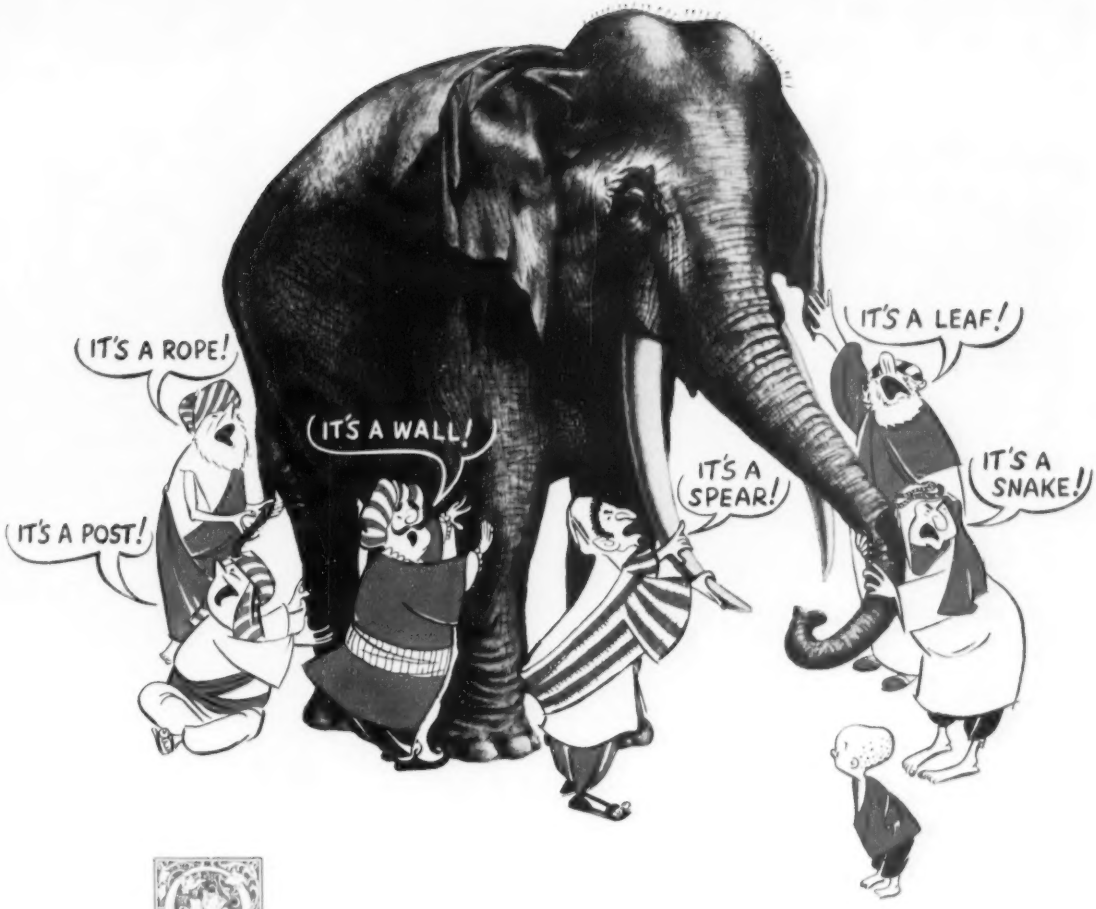
Consumers are expected to save about as much as last year in the first half of 1954. They may even save a bit more. The reason is that cuts in taxes will largely offset the initial effect of declining employment on personal incomes. Repayments of debts will be greater than they were last year, which means more money available for new loans.

3. Official policy on credit will be vastly different than in early 1953, unless the business trend turns abruptly upward.

Last year, the Treasury and Federal Reserve played a key part in boosting interest rates early in the year. Since then, they have reversed the direction of their policies. As long as business continues to slide, they are expected to emphasize making borrowing easier—which implies lower interest rates. In the last half of 1954, the Treasury will have to borrow large sums of money. Under ordinary business conditions, this might mean a squeeze on other borrowers. But, if business is still going down, the borrowing will be done from the banks—with the Federal Reserve standing by to support the new bonds and keep rates down.

Borrowing Costs Down . . . All in all, the picture indicates somewhat lower costs for utilities borrowing in 1954. There may be a short halt in the slide in interest rates in the next month or two, when business will be borrowing to finance some of its big tax payments. But the dominant trend in bond yields seems to be downward—until there is a basic change in the business situation.





ONCE upon a time there were six blind men, each of whom touched a different part of an elephant's body and came up with six different descriptions of it.

It might be well to remember this when considering the purchase of transformers. Unless the manufacturer considers the product's purpose objectively, it is quite possible that over-all performance will be sacrificed. Unbalanced design will not produce the efficient distribution system you are seeking.

Moloney products are designed and produced with your needs in mind. Over 50 years of experience in engineering, research, design and fabrication are combined to produce the best all-around transformers that you can buy. For better performance, greater reliability and less maintenance . . . specify Moloney.

ME-52-11

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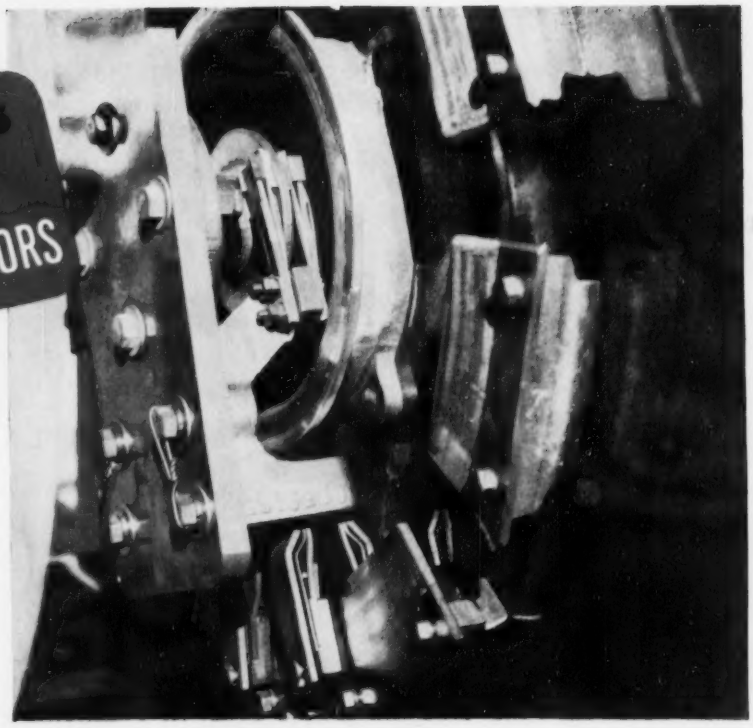


AFTER 17 YEARS' OPERATION

Practically No Wear!

The unretouched photo above shows the condition of the tap changer from an Allis-Chalmers power regulator that has changed taps 1,240,000 times on a western utility.

You can see from this photo that this regulator is still in excellent condition — it will give many more years of satisfactory service.

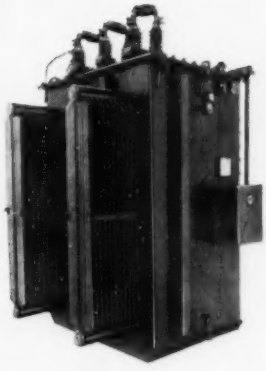
This 17-year operating record adds field proof to laboratory tests that have shown that the *Quick-Break* mechanism will withstand five million operations. You get this rugged, reliable mechanism on every Allis-Chalmers 5/8% step voltage regulator. It gives fast, clean wiping action that snaps moving contacts from one stationary contact to the next before there is time for damage to occur.

In addition, when you depend on Allis-Chalmers, you benefit from more than twenty years' experience building 5/8% step voltage regulators. No other manufacturer gives you this kind of design and operating experience.

Next time you consider regulation, for new or replacement installations, it will pay to get the complete facts about Allis-Chalmers regulators. Contact your nearby A-C district office or write Allis-Chalmers, Milwaukee 1, Wisconsin, for more details.

A-4242

Single-Phase Power Regulator



Three-Phase Power Regulator

Single-Phase Distribution Regulator

ALLIS-CHALMERS

Originators of 5/8% Step Regulation